Subterranea

The Magazine for Subterranea Britannica

Subterranea Britannica **April 2017 Issue 44**

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Underground Dorking
D-Day Visits near Portsmouth
Williamson's Tunnels, Liverpool
Welsh Bunker that never was

Subterranea Britannica is a society devoted to the study of man-made and man-used underground structures and the archaeology of the Cold War. The society is open to all and its membership includes all walks of life. Members are invited to contribute to this magazine even if this just means sending very welcome snippets from newspapers and magazines.

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Front cover photo: The underground Combined Headquarters at Fort Southwick in 2004. This high tunnel in the centre of the complex, was divided into four rooms. 'Trade Plot' and 'Mine Welfare Plot' were behind the photographer. Immediately in front of the photographer was the 'Main Operations Room' and beyond that the 'Plotting Room' with a gallery overlooking the plotting table. Photo Nick Catford

Back page upper: Looking down into the cathedral-like Ash Chamber at Level 4 at Paddington in Williamson's Tunnels, viewed from Level 3. The chamber has been cleared of huge amounts of dumped infill and is now almost 12 metres high from its lowest point to the brick arched roof. Photo Chris Rayner

Back page lower: Looking along the main tunnel in the Southern Railway underground traffic control centre at Deepdene in 1999. The telephone exchange is immediately behind the photographer and ahead is the emergency escape shaft. The bunker, which is riddled with asbestos, is now thoroughly sealed and inaccessible. Photo Nick Catford

Newsletters of Subterranea Britannica are published by the committee of Subterranea Britannica. Original articles, book reviews, press cuttings, extracts from books and journals, letters to the Editor etc. are welcome. However the Editor reserves the right not to publish material without giving a reason.

The committee of Subterranea Britannica and the Editor do not necessarily agree with any views expressed and cannot always check the accuracy of any material sent in.

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Chairman's Welcome

Martin Dixon

Linda and I have just returned from a fascinating trip to Vietnam as part of an organised group. By chance more than design it included a number of underground sites including the fascinating Cu Chi Tunnels; the former command bunker beneath the Independence (or Reunification) Palace in Ho Chi Minh City (Saigon); and a number of Buddhist caves with carvings and more Buddhas than we could shake a stick at.

The photos below show me disappearing into the Cu Chi Tunnels where even the widening for westerners made for a tight fit. Andrew Smith is talking about underground Vietnam at our upcoming Spring Meeting and many members will I'm sure be fascinated by his presentation.

What struck me as we discussed our passion for the subterranean with other members of our tour group was that the discussion usually goes through three (and sometimes four) distinct phases.

Firstly comes ***C****onfusion*; as most people say "oh, so you're potholers" confusing the comparative singularity of natural karst with the infinite variety of man-made structures. When this difference is explained, the second phase is often ***A****mazement*. People genuinely seem initially to struggle about what possible interest there might be in what they perceive as damp and dangerous underground space.

Thirdly, after describing some of the fascinating places we have visited, reflecting man's enterprises from the Neolithic to the Nuclear age, comes ***R****ecognition*. Most people with even a passing interest in history can be convinced of the vital role that underground sites have had in mankind's history. Mineral and metal extraction, warfare, religion, urbanisation and art (and occasional cultivation!) are all strongly linked to subterranean burrowings of one sort or another.

Finally, for a minority and often after a particular site visit, comes ***E****nthusiasm*. The desire to learn and see more of what lies beneath our feet; the passion to see sites first-hand and the understanding of such sites form a collective prism through which to view history. As the membership of Sub Brit shows, these converts come from all walks of life but individually everyone brings something to the party. So next time you're talking to friends or on social media, why not encourage a few more to follow the ***CARE*** pathway?

Once we were over the jet lag, the Sub Brit diary seems to have gone into overdrive. Within a single week in March were visits to Scout Chalk Mine (a return visit and arranged by Tim Wellburn), an Underground Croydon surface walk (Paul Sowan), Cabinet War Rooms visit (another repeat by Bill Ridgeway) and Clifton Bridge abutments and Rocks Railway (two visits, organised by Chris Rayner and Tony Radstone). I didn't make all of them but here were lots of opportunities for members to get underground and, as usual, our sincere thanks to the organisers.

But as I've also said before, if a visit was oversubscribed or your favourite site type hasn't been featured, then why not organise something yourself? The Committee is always happy to offer advice and we can usually set a trip up for online booking to reduce the workload. The Committee can also make trips 'official' if our liability insurance is needed. The three main prerequisites for this are:

* Appropriate Risk Assessment
* Not for Profit and
* Open to all Members

Hoping to see lots of members old and new above ground at our AGM and Spring Meeting.

chairman@subbrit.org.uk

Going, going, gone.....

SUBTERRANEA BRITANNICA DIARY

Summary of Forthcoming Events

Sub Brit specific events

2017

12 - 15 May SB Scandinavian Weekend
29 May Cuckfield ROC Post Open Day
8 June Paddock Open Day
10 June SB Committee Meeting
1 July Copy deadline for *Subterranea* 45
15 - 16 July Cuckfield ROC Post Open Days
6 August Cuckfield ROC Post Open Day
Mid August *Subterranea* 45 published
16 September Paddock Open Day
28 October Autumn Conference, London
1 November Copy deadline for *Subterranea* 46
4 November SB Committee Meeting
Mid December *Subterranea* 46 published

2018

14 April SB Spring Meeting & AGM, London

Other underground-related events

2017

28 April - 1 May Railway & Canal Historical Society AGM, Exeter
2 - 10 May Fortress Study Group Malta Study Visit
11 - 13 May International Early Engines Conference, Elsecar, South Yorkshire
13 May Reigate Caves Open Day
10 June Reigate Caves Open Day
23 - 26 June NAMHO Conference 2017, Godstone, Surrey
8 July Reigate Caves Open Day
15 - 30 July Festival of British Archaeology, UK-wide
23 - 29 July International Congress of Speleology, Sydney, Australia
12 August Reigate Caves Open Day
25 - 30 August AIA Conference, Northamptonshire
4 - 8 September Fortress Study Group - Alderney Study Tour
7 - 10 September Heritage Open Days, England
9 September Reigate Caves Open Day
16 - 17 September London Open House
29 Sept - 1 October Hidden Earth (UK Caving Conference), Somerset
September (tbc) Doors Open Days, Scotland
September (tbc) Open Doors, Wales

For web links to these events please visit www.subbrit.org.uk/events
or contact the Society concerned

If you know of other relevant events run by other societies, please let us know so that they can be advertised in the next edition and on the website

Summary Minutes of Committee Meeting

21 January 2017 at Goldwater Hall, Woking, 10.30

By Sub Brit Secretary, Linda Dixon

Attendees: Martin Dixon, Linda Dixon, Tony Radstone, Richard Seabrook, Chris Rayner, Bob Templeman, Paul Sowan, Tim Wellburn, Jason Hughes, Alistair Graham Kerr, Chris Gray, Adrian Armishaw. Apologies – Nick Catford, Richard West. Phil Catling was co-opted for the meeting with a view to joining the committee next year.

Health and Safety.

This is a standing item on our Agenda. Jason has attended an excellent Confined Spaces training course and will investigate a course for other Sub Brit members.

Preparation for the Annual General Meeting in April

Linda will manage the process of sending communications to all members. Nominations for next year's Committee were taken. Tony will liaise with our Accountant to get the Accounts ready.

Grants

We have received 200 copies of the new Brunel book, as part of our donation to the Brunel Museum. These will be available to our members, in return for a small donation to Sub Brit. Other grants have been made to the Cleveland Iron Museum, Friends of Williamson's Tunnels and Tranmere Tunnels. We continue to discuss a grant with the Post Office Railway. Other grants are in the pipeline – members are asked to let us know of other worthy projects.

Day Meetings

The Autumn Meeting in Belfast on 15 October 2016, with 2 days of visits on Sunday/Monday, went well, although we were a little disappointed that only 32 people attended. In 2017, the Autumn Meeting was decided as 28 October. Spring 2018 & AGM will be on 14 April at the RSM and Chris Rayner will investigate Nottingham for Autumn 2018 (20 October proposed) with visits on the Sunday.

Visits/Trips

We are in the early stages of planning another trip to Gibraltar. The Copenhagen weekend is well underway with booking due to start on 5th February; email to go out to all in mid January. Portsmouth/IOW is also in the early stages of planning for 12/14 August 2017. See *Diary* for other trips.

Day Visits/Trips

We are pleased with the number of trips being arranged – three to RAF Barnham have been set up by Chris Rayner along with a trip to Caerwent; Martin ran a trip to Fort Southwick. There are also trips to Maidstone and Oxford ROC HQs, a second trip to Scout Mine in Reading and two day-trips to Bristol. There is a proposal for Dover & Northern France and others in the planning. If members have suggestions or can run trips, then please get in touch.

Sub Brit Site Directory

Committee members will help with updates to this and we will ask our SubT publisher for a 'fresher' look.

Website and my.subbrit systems

We will investigate commercial help with Hosting and Support for our systems.

Three more Sub Brit members have volunteered to help with moderation of the Sub Brit Forum.

SUBTERRANEA BRITANNICA

Portsmouth and Isle of Wight weekend 12 - 14 August 2017

This year's UK visits weekend is being arranged by Alistair Graham Kerr, a Sub Brit Committee Member. Alistair is also a member of Fortress Study Group and arranges many of their member trips.

Saturday, it is hoped to head to the Isle of Wight for the day-trip by hovercraft. We are looking to go to the Needles Fort and Battery followed by a visit to the Black Knight Missile Launch Site. Other sites TBA; if there is time the IoW railway still uses 1938 Northern line stock.

Sunday, Morning visit to Fort Widley and Fort Purbrook followed by Fort Southwick (times may change). Beneath these are Victorian Tunnels, Magazines and Caponiers, WWII D-Day Headquarters and a Cold War Control Centre

Monday Optional extra: Fort Nelson. There is also the possibility of a limited trip for 10 people to a Solent Fort. This will be at an extra cost and weather permitting.

Accommodation will be at Rees Hall opposite Southsea Castle for Saturday and Sunday night, Bed & Breakfast.

The Cost this year will be around £180-200 per person, with a £40 supplement for a single room.

Bookings for the trip will be taken online. If you do not have access to the internet, then please send a letter expressing your interest to our registered address. All attendees must be members of Sub Brit for insurance purposes.

You must be 18 or over to attend, or be accompanied by a parent/guardian.

The trip will be advertised by email to members, once details are firmed up.

NEWS

Miscellany compiled by Paul Sowan and Nick Catford

NEWS – ARCHAEOLOGY

Neanderthal man in Jersey, Channel Islands

A cave at La Cotte de St Brelade in Jersey has evidently been favoured by Neanderthal man over 100,000 years, even after significant climate and changes in the landscape. A team of archaeologists has studied stone tools from the site excavated in the 1960s and 1970s and concluded that the cave was in almost continuous use between at least 180,000 and 40,000 years ago. Some of the stone tools have evidently been made from materials found near the cave, but others were imported. During the Ice Age, when sea levels were much lower than today, stones of various kinds could have been found in a much more extensive area than Jersey as we know it today.

SOURCE: ANON, 2017, Neanderthals in Jersey. *Current Archaeology* 27(12)(324), page 10.

Archaeology of World War I structures around the British coasts

As an occasional seaside visitor as a boy in the 1940s and 1950s your scribe recalls numerous abandoned cliff-edge concrete structures which are of course largely still in place today. These were another aspect of the legacy of the World Wars contrasting with the familiar numerous bombed sites inland. A group called CITZAN (Coastal and Intertidal Zone Archaeological Network) has taken an interest in the earlier, World War I relics on the coast. Objects from concrete defences to fragments of German submarines are reported.

SOURCE: BAND, Lara, et al., 2017, CITZAN goes to war: Britain's coastal frontline 1914–1918. *Current Archaeology* 27(12)(324), 24 – 31.

NEWS – CONSERVATION AND HERITAGE

Dudley Tunnel Visitor Centre, West Midlands

Most Subterranea Britannica members probably know of the spectacular success story of the Dudley Canal tunnel and the huge limestone mine caverns with which it communicates. The canal and the tunnel have gone from off-limits desolation to a thriving visitor experience adjoining the Black Country Museum between Dudley and Sandwell. Visitors can now enjoy a boat trip through the tunnel, and into one of the impressively spacious caverns where limestone was mined a couple of centuries or so ago for use in the local iron-smelting furnaces.

Waterways World reported in April 2016 that a new visitor centre was opened on 14 March, with exhibition galleries explaining the local geology and the history of the canal and the mines, and a restaurant. Both the tunnel and the Black Country Museum are highly recommended for a day out for adults and children interested in the heritage of the area.

Photo Ron Fisher

SOURCE: DUDLEY CANAL AND TUNNEL TRUST, 2016, Princess Royal to open new Dudley Tunnel Visitor Centre. *Waterways World*, April 2016, page 39.

The first quarter-century of the Friends of West Norwood Cemetery, south London

A success story for a voluntary conservation society, the Friends of West Norwood Cemetery, a registered charity, has been celebrated by the publication of a 12-page booklet outlining that body's achievements in its first 25 years. This spectacular last resting place of the rich and famous of south London will be known to many members of Subterranea Britannica on account of visits to one of the two atmospheric subterranean catacombs. A group of people, alarmed at the neglect by Lambeth Council of this astonishing collection of over-the-top memorials commenced guided cemetery tours in 1990 and, in 1991, halted the progressive clearance of the monuments.

Clearance and resale of the private graves was declared to be illegal in 1994, and in 1997 the cemetery was closed for new burials other than in existing graves. In 2000 the catacombs were closed to the public, but since 2010 the Friends have organised guided tours of the underground burial chamber as well as of the surface structures. They have organised conservation of some of the more impressive monuments and some of those of the more famous persons buried here. An *Introductory Guide* was published in 2007, and a frequent *Newsletter* contains well-researched accounts of some of the more interesting occupants of the graves or catacomb shelves. For details of tours contact www.fownc.org or telephone 020 8670 5456.

SOURCE: FRIENDS OF WEST NORWOOD CEMETERY, 2016, *Friends of West Norwood Cemetery 1990–2015: 25 years of research and conservation.* Friends of West Norwood Cemetery: 12pp.

Grime's Graves prehistoric mine shaft is open for the first time

The new mineshaft can be accessed from April 2017 at Norfolk's Grime's Graves – the only flint mine open to the public in the British Isles.

The new Greenwell's Pit is one of more than four hundred shafts dug at the site where flint was first extracted to make tools including axes during the Neolithic period. Visitors will be able to see a mining shaft in its original archaeological state. English Heritage will provide access to members from April and the public from June, both via special tours. Visitors will use a ladder and a newly installed winch to descend 12 metres below the ground.

Grime's Graves is one of only ten known prehistoric flint mines in England. Greenwell's Pit is the second of the 4,500-year-old shafts at Grime's Graves currently open to the public.

Greenwell's Pit

Hundreds of mine shafts were dug at Grime's Graves for the purpose of extracting valuable jet-black flint to make tools, weapons and ceremonial objects. These shafts would have been formed around the time that many of the stones at Stonehenge were first raised, and would have provided vital materials to Neolithic communities. It is thought that the mines stopped being used in 2100 BC when people began to favour bronze.

Greenwell's pit will be open for public tours on Thursday 1 June and Friday 14 July. The cost is £25 for English Heritage members and £29.30 for non-members. This event has been graded as 'challenging access' as the descent into the pit is by winch and harness only and will require an extended period underground. There will be trained members of staff on hand to assist. There is a weight limit of 300lbs. To book a place call 0370 333 1183.

SOURCE: *English Heritage*, 6 March 2017.

The end of an era as Dr James Fox retires

Dr James Fox has spent much of his working life in the museum industry and has been responsible for establishing or helping to establish some of Britain's most popular WWII and Cold War museums.

James Fox has been involved with the following: Dover Castle Tunnels project: 1985 - 1990, Liverpool War Rooms (Western Approaches): 1990 - 1992, Scotland's Secret Bunker (Anstruther): 1992 - 1994, Mistley Bunker: 1994 - 2003 and RAF Holmpton: 2003 - 2017.

After 35 years in the business, he officially retired from 1 January 2017. Although James has now moved out of his home in the Holmpton bunker he will continue his association with RAF Holmpton where he has become a patron. He will still be at the bunker occasionally to meet visitors and hold some one-day special events.

The day-to-day management of the museum has passed to John Swift (who has worked alongside James in recent years) and his wife Sylvia. John has been busy building new features and working on opening new rooms for the 2017 season which begins on 8 April.

James Fox will be a difficult act to follow. He is an excellent tour guide with a unique ability to hold the attention of visitors with his encyclopedic knowledge of Cold War history.

SOURCE: Nick Catford

NEWS – MILITARY AND DEFENCE

Inter-war and early World War II defences in the Isle of Thanet, Kent

Victor Smith's latest contribution on defences in Kent focuses on The Isle of Thanet in northeast Kent, where the principal towns include Margate and Ramsgate, and RAF Manston is also nearby. An interior view in the chalk tunnelled air-raid shelters at Ramsgate is included.

SOURCE: SMITH, Victor, 2017, Thanet's defences in the 20th century. Part. 1919– mid-1940. *Casemate* 108, 20–24.

Cannabis farm found at Chilmark RGHQ

Officers from the Dedicated Crime Team arrested six people following a midnight raid on RGHQ Chilmark – an underground nuclear bunker constructed in the 1980s. Although the site is no longer owned by the Ministry of Defence, the bunker is still intact and the nuclear blast doors are still in place.

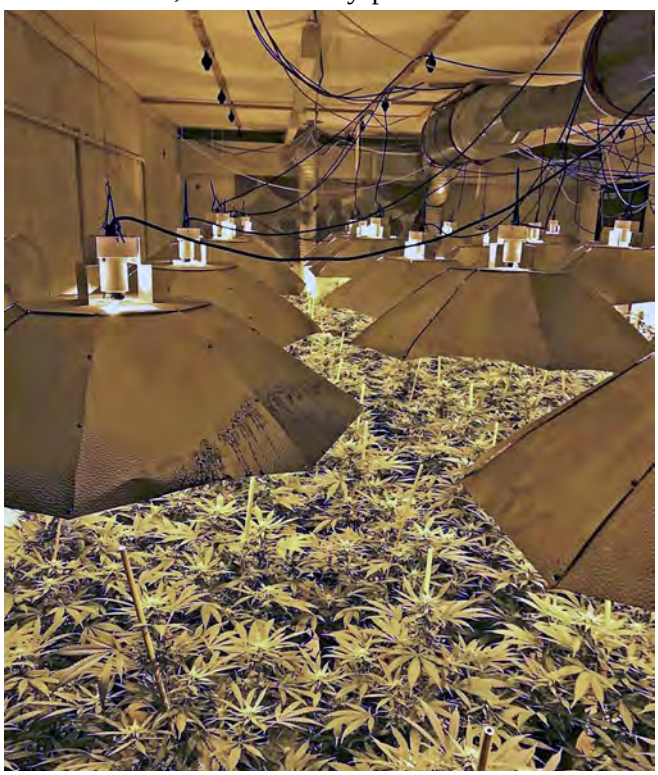
Officers attended during the night on 22 February 2017 after gathering intelligence. With the knowledge that the bunker was almost completely impenetrable, officers waited outside for three people to leave and detained them, using their keys to gain entry. Once inside, officers found four people,

believed to be operating as gardeners, along with several thousand cannabis plants at various stages of growth.

The four males found inside the bunker, all of no fixed abode, were arrested on suspicion of cannabis production and taken to Melksham police station. The three males detained outside the bunker, all from Somerset, were arrested on suspicion of cannabis production and human trafficking offences.

Detective Inspector Paul Franklin, of the Dedicated Crime Team, said: "There are approximately 20 rooms in the building, split over two floors, each 200ft long and 70 ft wide. Almost every single room had been converted for the wholesale production of cannabis plants, and there was a large amount of evidence of previous crops. There was plenty of food in a fridge in the bunker's kitchen, and a basic sleeping area in one room. This was an enormous set-up. At this early stage of the investigation it is almost impossible to work out how many plants are inside, but we are talking thousands rather than hundreds and we would estimate the value of the crop at over £1 million. I am convinced it is one of the largest crops ever discovered in Wiltshire.

"The actions of officers took a large amount of planning and teamwork, and I am very pleased that it has been



so successful. This is the largest and most sophisticated cannabis factory I've ever experienced and I am delighted that we have been able to take such a large amount of illicit drugs off the streets of Wiltshire before they are able to reach vulnerable people within our communities."

Three British men were later charged with conspiracy to produce cannabis, and conspiring to hold another person in slavery or servitude. The four Vietnamese men were released from custody, and were told no further action would be taken against them.

SOURCE: *Metro*, 24 February 2017 and *The Guardian*, 25 February 2017.

1,200-ton WWII bunker moved to new location in one piece

Mammoet is a Dutch company specializing in the hoisting and transporting of heavy objects. Mammoet has used a gantry placed on self-propelled modular transporters to move the first of three concrete bunkers by the Lek Channel near Vreeswijk, the Netherlands. The bunker was part of the Nieuwe Hollandse Waterlinie, a series of works constructed before World War II to defend the Netherlands against foreign invasions.

Because the bunker is an important piece of historical heritage, it was decided to move the heavy concrete building in one piece. The gantry was put in place to support the weight of the bunker, allowing the contractor to separate the building from its foundation. After the bunker was detached, Mammoet was able to transport the 1,200-ton structure 150m to its new location. At its new location, the bunker was turned and positioned onto the new foundations at an angle. It was placed into the landscape as an *Objet Trouvé* – an object found by an artist and displayed with minimal alteration as a work of art.

Mammoet used a combination of a skidding system and four strand jacks to rotate the bunker. By lowering two strand jacks while two other strand jacks held still, the bunker could be rotated while its centre of gravity remained stationary.

The project was a challenging assignment for Mammoet. The bunker was designed to withstand bombing raids, so a special drill had to be used to cut through the reinforced concrete, enabling it to be attached to the gantry. The team also had to create a road between the old and new locations to ensure that the transport would not get bogged down in muddy ground during the operation. In addition, the bunker had to be positioned at an angle, to highlight to everyone who passes the bunker that it has been moved.

The bunker is not the only object that will be moved to make way for widening the channel. In total, Mammoet will be moving three bunkers and two water management structures during the upcoming months.

SOURCE: *Cranes Today*, 28 February 2017.

New use for Salisbury Cold War bunker

It's taken two years of blood, sweat and tears, but finally the former Salisbury Urban District Council Control Centre has a new lease of life as a youth music venue.

Charity Life Rocks has completely transformed the disused Cold War site into practice rooms, meeting spaces and a recording studio which was available for use by the city's young people from Friday 3 March. The new rooms take inspiration from famous music venues like the Hard Rock Cafe, the Cavern Club and Abbey Road.

The Sound Emporium will provide six hours of free youth service a week, and it is hoped that youngsters across Salisbury will benefit from the new recording studio. Co-founder Ross Sanderson said that he was excited about the future, and told the crowd at the opening ceremony: "We have made it. It has taken a couple of years, but we have made it."

Planning permission for the bunker's conversion was granted in January 2016, with building work starting shortly afterwards thanks to a grant of £100,000 from Wiltshire Council. There was a mixed reception about the prospect of a recording studio moving into a residential area, with neighbours and various city councillors opposing the scheme. But some residents, including Mayor Derek Brown, have been converted after seeing the transformation of the Cold War structure. The Mayor said: "I am delighted about this; it will provide entertainment and amenities for all in Salisbury. I was originally against the idea, as it was a large amount of money; but once it fitted within the budget I became a supporter."

SOURCE: *Salisbury Journal*, 3 March 2017 and *Spire FM*, 3 March 2017.

WWII operations centre in Malta being restored after years of neglect

Years of neglect, theft and vandalism are being reversed at Valletta's Combined Operations Room, Malta's nerve centre during World War II. The heritage NGO Fondazzjoni Wirt Artna recently embarked on the delicate challenge of restoring this rock-hewn room to its original configuration.

Built in the early stages of the air battle for Malta in 1940, within the underground War Headquarters complex beneath the Upper Barrakka, the Combined Operations Room was the place from which all the defensive and offensive naval and military action in and from Malta was directed.

The restoration of the Combined Ops Room is a mammoth task and will take over a year to complete. It can now be undertaken following a cash injection of €280,000 from the Malta Airport Foundation. It is hoped that the bunker will be open for visitors by the end of 2018.

The Combined Operations Room was the place from which all the naval and military action in and from Malta was directed during World War II. Some of the rooms are to be completely reconstructed based on authentic documentation, while the main room will be conserved in its postwar 1969 configuration when it was in use by NATO.

Left abandoned for decades, the rooms suffered further damage from years of flooding until the government handed the complex over in a trust to the FWA in 2009. With the help of Malta Airport Foundation funding and the Malta Environment and Landscaping projects, the FWA set about first solving the massive flooding problem from fourteen leaks and excessive water ingress from the Upper Barrakka gardens.

The next step was tackling the problems Malta's humidity was causing, such as serious damage to all the timber and metal works, besides making the air heavy and musty. However, the biggest hurdle in this project was the difficulty in obtaining enough documented historic and technical information to help restore the facility to its original configuration. This information is also needed to help the trust to interpret the entire complex, which is spread over some 28,000 square metres of tunnelling and open areas.

The Combined Operations Room consists of a row of rooms which together formed Malta's main air defence platform against enemy attacks during World War II. After the war, the rooms were used as the Royal Navy's Communication Centre and the Royal Air Force headquarters. In 1955, part of the place was assigned to NATO, which used it until 1971.

The Combined Operations Room as it originally looked

During the Cuban missile crisis in 1962, the complex was placed on a war footing, and all staff were closed in for three days as it was feared that the naval base in Malta could be attacked by the Soviets in case of an international escalation.

Extensive works were carried out on parts of the former War HQ complex – along with the nearby St Peter and St Paul counterguard, the Saluting Battery and the

former Garrison Church Crypt – between 2013 and 2014. These works were co-funded by the European Regional Development Fund and the government, but given the sheer size of the project's footprint, this was not enough to cover the entire area. In fact, there were no funds left to restore the Combined Operations Room, which is when the Malta Airport Foundation stepped in to help the FWA finalise the restoration of the complex.

Set up in 2014, the Malta Airport Foundation directs funds into the tourism industry by investing in Malta's heritage and environment and implementing Malta International Airport's corporate responsibility projects and investments. The foundation's contribution in this project is the largest ever in Malta's heritage to date.

Since Valletta is a key tourist attraction, they felt this historic complex would add great value to the heritage sites on offer, especially since the Lascaris War Rooms, a sister site for the Operations Room, is one of the top attractions on Trip Advisor.

SOURCE: *Times of Malta.com,* 29 January 2017.

Forts at Rome, Italy

Any major European city can be expected to have more than sufficient underground sites to satisfy visiting Subterranea Britannica members for a long weekend. So it is the case with Rome, where we enjoyed four splendid days of visits last year. An article in the Fortress Study Group's magazine *Casemate* describes the ring of 15 forts encircling the Italian capital. They were all built in the years 1877 to 1891.

SOURCE: GOODWIN, John, 2017, Establishment of UK Army plotting rooms in Combined Naval and Military Headquarters, 1940–1941. *Casemate* 108, 40–42.

Portland ROTOR bunker permanently sealed

In 2013 Sub Brit organised an open day at the Portland ROTOR bunker in Dorset. The land on which the bunker is located is leased to Fancy's Farm, a community farm that has become a popular tourist attraction in the area. They do not use the bunker for any purpose and they allowed Sub Brit to run the open day for which £5 was charged with the money going to Fancy's Farm.

Access to the bunker is down a forty-foot fixed ladder in the old lift shaft. We had over 100 visitors during the day so the farm received over £500 – they were absolutely delighted and invited us back at a future date. A large number of people joined Sub Brit just to get access to the bunker; the trip being covered by our insurance. Many of these were local people who got to hear of the forthcoming visit.

We intended organising a repeat trip this year but when I contacted the farm in February to arrange the date I was informed that the bunker had been sealed because of asbestos deterioration caused by water ingress. Before the bunker was sold to the present owner anything hazardous, including asbestos, teak flooring, stairs and the lift, was stripped out. £100,000 was paid by the MoD to make the bunker safe; this included the installation of a fixed steel ladder. Asbestos fibres have now been found in the terylene that was sprayed over the ceilings throughout this and all ROTOR bunkers.

The new Ladder in the lift shaft; climbed by over 100 Sub Brit members on 25 May 2013.
Photo Nick Catford

The 12.59-acre Portland site was sold at auction to local pub landlord Gary Nash for £142,000 in October 2001. Gary Nash owns the *Royal Portland Arms* in nearby Fortuneswell. Mr Nash was hoping to use the bunker and the land surrounding it to attract tourists to the area but this never happened and he eventually leased it to Fancy's Farm.

SOURCE: Nick Catford.

Scottish Cold War bunker receives lottery funding

Plans to convert the former Cold War bunker into the new home of the Gairloch Heritage Museum have taken a step forward with the award of £725,600 of lottery funding. The Heritage Lottery Fund grant towards the *Our Land, Our People, Our Story* project will see the bunker transformed into a first-rate visitor attraction and community heritage hub as well as securing the long-term future of the museum's collections and cultural activities. It is envisioned that the museum will open in its new premises in early 2019.

Artist's impression of the Gairloch Heritage Museum

Over the years the derelict bunker has been used as an anti-aircraft operations room; its original purpose an emergency operations centre; and a council roads depot. In its new role it will house expanded displays and improve access to the museum's collections and will also offer training opportunities both for the museum's

volunteers and, in partnership with UHI, for the area's young people. A number of professional jobs will also be created within the new centre.

The museum has been managed and run by volunteers since 1977 and is a cultural hub for Gairloch and the surrounding area. It houses the first Pictish stone found on the west coast of mainland Scotland and its Gaelic language and literature resources are highly valued by Gaelic scholars.

Roy Macintyre, chairman of Gairloch Heritage Museum said: "Our project is a very ambitious one for a community of our size, but is the only way to make the museum sustainable and keep it open, preserving our heritage for the future. The investment by the Heritage Lottery Fund is a vital part of the total funding package for the project and we are now very hopeful of raising the remaining funds to start building a fabulous new educational and heritage resource for our community in the New Year."

SOURCE: *West Highland Free Press*, 19 December 2016.

Farm based in deep level air-raid shelter starts selling salads to major supermarket

A farm based in the former Clapham Common deep shelter beneath Clapham High Street has begun selling its salads to a major supermarket.

Growing Underground is selling five salad mixes in its first range through online supermarket Ocado in the first major retail deal for the five-year-old business. Co-founder Steven Dring said the farm had huge potential for expansion and was currently using just one eighth of 65,000 square feet available in the two-level shelter beneath the Northern line.

The leaves already harvested are English mustard, broccoli shoots, pea shoots, salad rocket, garlic chives, fennel, coriander, purple radish and pink stem radish. The Ocado deals come as supermarkets struggle to source salad ingredients, courgettes, broccoli and cabbage after a cold snap on the continent hit suppliers in Spain and Italy.

Growing Underground began their business in the nearby Clapham North deep shelter which did not have a lift. When the Clapham Common shelter became available following the departure of the previous tenant Iron Mountain, Growing Underground moved their operations to the Clapham Common shelter.

Sub Brit members have had a number of visits to the Clapham North shelter, the most recent one in June 2014 courtesy of Growing Underground whose owners first found out about the deep shelters from the Sub Brit website. See *Subterranea* 35 (April 2014).

SOURCE: *ITV News*, 1 February 2017.

NEWS – MINES AND MINING

Buckingham mine, Somerset

A 'Cornish style' engine house stands near the road westward from Cannington to Holford, near the Hinkley Point power station in Somerset. This is the Glebe engine house for the former Buckingham mine, an extensive set of burrowings from which copper ore was won between 1760 to about 1822.

Glebe engine house; Hinkley Point power station is seen in the distance. Photo Nick Chipchase

The miners at one point broke into spectacular natural caves. Nick Chipchase has recorded several hitherto unsuccessful attempts to regain access to the main mine-workings and the natural caves. His report includes a sketch map of known possible access points.

SOURCE: CHIPCHASE, Nick, 2016, Buckingham mine (NGR 17567 40516 (Capped shaft on adit). *Newsletter, Chelsea Spelaeological Society* 58 (10/11/12), 22–23.

Barnsley: 150th anniversary of worst English mining disaster, the Oaks Colliery, South Yorkshire

Two explosions underground at the Oaks Colliery near Barnsley killed 383 men and boys on 12 and 13 December 1866. Shockingly, the ages of the dead ranged from two boys of 10 and two of 11 years old, to two men lucky enough to reach the age of 63. Where ages have been determined, it is reported that over a hundred victims had not reached their 20th birthdays, and only just over thirty were 40 years old or older. However much we may protest at the over-zealous implementation of 'health-and-safety' tick-lists on the grounds that it is always easier to say NO, it has to be admitted that the 1974 Act was much needed.

SOURCE: BARNSLEY MUSEUMS, 2016, 4pp. *150th anniversary: When the Oaks fired, 12 December 1866, the worst mining disaster in English history.*

Possible return of mining to the Cumbrian coast

A company called West Cumbria Mining, but based in Sussex, is investigating the feasibility of mining anthracite (hard low-volatile coal) near St. Bees on the northwest coast of England. Coal was once mined from under the sea in this district, for example at the former Haig pit near Workington, where the surface buildings kept as a colliery museum were visited by Subterranea Britannica a few years ago. The site near St. Bees has also seen drift mining for anhydrite. The company contemplates mining anthracite to be conveyed via a 'box conveyor tunnel' to rail transit on the Cumbrian coast line.

Anthracite is used in steel manufacture such as at Port Talbot in South Wales, and in Germany, but not much mined in Europe, making the St. Bees proposal appear financially attractive. Test drilling to assess reserves in the seams commenced in 2014 and continues. A planning application for a new mine is expected to be lodged in 2017.

SOURCE: WEST CUMBRIA MINING, 2016, West Cumbria Mining. *Down to Earth* 97 (November 2016), 4–5.

Shale gas exploitation approved near Blackpool, Lancashire

Cuadrilla, whose planning application for the extraction of shale gas near Blackpool was refused by Lancashire County Council, has been given the go-ahead by the UK Communities Secretary Sajid Javid. Extraction may commence as early as 2017 at the Preston New Road site between Blackpool and Preston, and possibly also at nearby Roseacre. There has been no shale gas extraction by 'fracking' for five years since Cuadrilla allegedly caused earth tremors in the course of such work.

SOURCE: UNITED KINGDOM, 2016, Government gives green light to fracking in rural Lancashire. *Down to Earth* 97 (November 2016), page 4.

Australian couple wake to find their back garden disappearing into huge sinkhole.

Ray and Lynette McKay had no idea their home in the Queensland city of Ipswich sat right over a disused mine shaft dating back to 1885.

The couple bought the house in 1991, on the improbably named 'Coal Street' with very little knowledge of the history of the area. The sinkhole was another unwelcome event in their already troubled time in Queensland. The couple lost all their possessions during the 2011 Queensland floods, which hit their home, destroying it.

The McKays were moved to temporary accommodation in a hotel as mining teams examined the site, with a view to repair the hole. According to local mayor Paul Pisasale, the collapse was down to a 100-metre-deep exploratory shaft dug at the site between 1903 and 1920, that miners "should have recorded properly". He added, "this shaft was filled up with rubbish and bottles and whoever did it [fill it], didn't follow very good practices." Initially the sinkhole was only a metre in diameter but it had grown to 12 metres within 24 hours.

The city of Ipswich has faced a series of collapses and sinkholes in residential areas over the past few years. A number of underground mines in the area were abandoned after flooding hit the area in 1974, destroying many buildings. Pisasale played down concerns that other sinkholes from improperly recorded mining shafts could occur in the city but conceded that "the past comes back to haunt you occasionally. We know which suburbs have got [mines] and if you look at all our planning maps for people buying residential property, everything is safe and it's all recorded now online for everybody to see," he said.

SOURCE: *Express*, 10 March 2017.

The last cats underground at Kellingley, North Yorkshire

Four feral cats made history in December 2015 on the closure of the last deep coal mine at Kellingley, North Yorkshire. Florence, Betty, Leia and Solo, two named after miners' wives and two after *Star Wars* heroes, were reportedly the last working animals in a British coal mine. Their jobs in the former subterranean stables were, of course, to control rats and mice (as were railway station cats once). All four were captured, a tricky business down a mine, brought to the surface, and re-homed. The cited article includes an historical photograph of a group of miners underground near Pontypool, one of them nursing a moggy.

SOURCE: HARRISON, Linda, 2016, Life at the coalface. *The Cat*, Autumn 2016, 15–17.

Thirteen miners trapped in a copper mine, Turkey

A collapse in a copper mine near Sirvan in the southeastern Turkish province of Siirt, has killed at least three miners, and left thirteen others at present unaccounted for. The fall of rock appears to have been caused by heavy rain, and has cut off access to or buried trucks and machinery, if not the unaccounted-for miners who may, with luck, have survived beyond it.

SOURCE: ANON, 2016, Hunt for 13 workers as copper mine caves in. *Evening Standard*, 18 November 2016, page 27.

Collyweston slate mine to reopen

Collyweston mine in Northamptonshire has reopened to produce 'slate' for a new roof for Bodley's Court, King's College, Cambridge. As part of the College's Strategic Infrastructure Programme, Bodley's Court will be re-

roofed in 2018 in order to replace the stone slating which has delaminated since being laid in 1893.

Bodley's Court has housed hundreds of students, including Alan Turing, but is now in need of both external and internal renovation.

In order to preserve its listed building status, Historic England stipulates the importance of using slate ideally from the Collyweston mine to replace the roof, due to the local historical significance of the material, and replacing like for like. This building has mostly Collyweston slate, as have many other buildings in Cambridge, perhaps the most iconic example being the Round Church on Bridge Street. It is intended that the entire roof will be laid with the new stone, once extracted and split, in 2018.

The Collyweston mine, located in Northamptonshire, was reopened with the support of King's College and expressly for the Bodley's roof slate extraction. The new seam holds approximately ten years supply, of which two years' resource is needed for the project in its entirety. Extraction began in mid-January 2017, after which the stone blocks will be weather-proofed and split using an innovative 'freeze-thaw' method, which will emulate the natural annual lamination process of the seasons. Thus a typical three-year process can be reproduced in as many weeks, although the process in this case will be conducted

at a more manageable and sympathetic pace.

Sand cleared from underneath the seam creates a supported gap. (This looked much the same when I visited the mine in 2000 – Editor.) Photo by Georgia Crick-Collins

The Clerk of Works, Shane Alexander, outlines the process: 'there is evidence that Collyweston stone (limestone) slate was used as far back as the Romans, slate is generally split into thicknesses by a skilled person using a hammer and chisel. Collyweston differs from this process by traditionally leaving the damp log (section of mined wet stone) on a bed of shale in the open air, to allow a natural splitting occurrence. This is achieved by allowing the log to freeze/thaw causing the layers (strata) to fracture, before using a cleaving hammer to pull the layers apart. Back in April 2014 Historic England recognised a shortage in supplying Collyweston slate for listed buildings, and tried to replicate the freeze method by placing the damp logs into a commercial freezer - the trials for this worked so well that several of the remaining mines have adopted this method, including Collyweston. We are also in discussion with the local conservation officer to install a secondary glazed unit for approval, keeping the appearance of the leaded windows from the outside the same (also due for refurbishment during the works), whilst improving the thermal loss.'

SOURCE: Kings College Cambridge 19 December 2016.

NEWS – MISCELLANEOUS

Harry Beck's 1933 Tube map again on display

There has been a copy of Harry Beck's iconic London Underground system map displayed on the southbound platform at Finchley Central station (Northern line) for

some time, but over the years it became faded, and was removed in November 2016.

In December a splendid new enamel version replaced it, with a panel explaining that Harry Beck lived in Finchley and used this station on his way to work at LPTB. Beck's original 1931 design inspired maps of transport systems all over the world, and has been copied, and parodied, hundreds of times.

SOURCE: Stewart Wild.

Barnet Physic Well opening dates

A mediaeval below-ground well in Barnet, not far from Barnet General Hospital, will be open to the public on at least three dates in 2017, Barnet Museum & Local History Society has announced. These dates are Saturdays 22 April, 20 May and 24 June, from 2 until 4pm. There may well be more dates later in the year.

Barnet Museum is collaborating with Historic England and the Heritage of London Trust to restore the Physic Well. As part of this initiative, Barnet Council has agreed to transfer ownership of the Well (possibly through a long lease) to the Museum and it is hoped to open the Well to the public on a regular basis. SOURCE: Barnet Museum & Local History Society, *Newsletter,* Spring 2017.

The charnel houses

Documentary research suggests that fifty or more medieval repositories for human bones once existed in the country. Some were small surface buildings, while others were underground rooms.

A recent paper suggests that of the subterranean charnel-houses or ossuaries surviving in England, only two still contain stored bones, one under Holy Trinity Church at Rothwell, Northamptonshire, and one below St Leonard's Church at Hythe in Kent. However, long-standing members of Subterranea Britannica will recall visiting another mass of skeletal fragments under a church in Bristol visited during one of our earlier Study Weekends.

The Charnel house at Holy Trinity Church, Rothwell. Photo Chris London

The 14th-century church at Rothbury has its charnel-house under the south aisle, accessed by way of a narrow, winding staircase from a porch. The subterranean room, open to the public, had at some time been sealed up, and two high-level windows at ground level blocked. It contains the remains of an estimated 2,500 persons, many of whose skulls are neatly lined up on shelves, the remaining bones being stacked separately. There are traces of a wall painting, the details of which are now not clear, and niches possibly for candles. No identifiable fragments of coffins or articulated bones have been reported, from which it appear that no more than post-mortem disarticulated fully decayed exhumed skeletons were deposited in the chamber.

This under-floor space was reportedly rediscovered in about 1700 by a man digging a new grave. He fell without warning into a pitch dark stone-vaulted chamber full of disarticulated skeletons. In the ensuing centuries the place has been a minor tourist attraction and the bones 'tidied up' with no record kept of how they were originally arranged.

Amongst early explanations put forward were that the bones were of victims of the Black Death in the 14th century, or of the Battles of Bosworth Field in 1485 or Naseby in 1645. Another has been that older graves had been cleared for new burials or for new buildings. Carbon dating has revealed that the bones are of a wide range of dates from the late 14th century onwards, with apparently a few isolated individuals deposited much later, after the place was reopened about 1700. This was not therefore an accumulation of the remains of soldiers who all died in a matter of days in a single battle and, indeed, the skeletons were of women and children as well as adult men.

The suggested interpretation, based on archaeological studies at Rothwell alongside archival research, is that sub-surface ossuaries were not simply pre-existing cellars pressed into use after graveyard clearances, but purpose-built visitable places where people could pray for the souls of their deceased relatives, hence the convenient permanent staircase entrances, windows, and wall paintings, where the relics could be purposefully displayed in an 'aesthetically pleasing and orderly manner',

The Reformation in the 16th century saw revised beliefs concerning death, purgatory, and ascent into heaven or an eternity of hell and damnation. The practice of accommodating and displaying exhumed bones in publicly visitable places was then abandoned,

More recently, Sub Brit members who attended our Study Weekend based in Prague in May 2014 saw a European ossuary when one of the visits was to the 'Bone Church' on the outskirts of Kutna Hora. Here a very large basement room is home to thousands of human bones tastefully (if that is the appropriate word) arranged as chandeliers, shields and artistically designed patterns.

SOURCE: CRAIG-ATKINS, Elizabeth, Jennifer CRANGLE, and Dawn HADLEY, 2016, The nameless dead: exploring the Rothbury Charnel House Project. *Current Archaeology* 27(9)(321), 40–47. [With added comment and information]

Rave in Ouseburn sewer, Newcastle 'put lives at risk'

Police officers were called to the tunnels underneath the bridges at the mouth of the River Ouseburn, early on Sunday 12 March, after a number of people at the event contacted them with safety concerns.

Ouseburn sewer. Photo Chris Rayner

About two hundred revellers had waded through water to access the area, where sound and lighting systems had been set up. No arrests were made, and Northumbria Police said inquiries were ongoing. It is believed the event was advertised on Facebook, and those who attended met at a local pub before being led into the underground venue.

Police disrupted the event at about 04:00 GMT on Sunday. Speaking later that day, Ch Insp Dave Pickett said: "This is a dangerous site for members of the public, never mind an appropriate party venue. It is not an area that is easy to access so if anyone needed the assistance of the emergency services then they would have been in severe trouble. We are very lucky that we are not talking about a more serious incident, particularly when you consider that many of those involved were under the influence of alcohol."

On New Year's Eve police had to use cutting equipment to gain entry to an illegal rave inside a tower of the Tyne Bridge, after organisers barricaded themselves inside.

SOURCE: *BBC News – Tyne & Wear*, 14 March 2017.

Ove Arup's work celebrated at an exhibition at the Victoria & Albert Museum, London

Ove Arup [1895–1988] and the engineering firm he founded are perhaps best known for the design of the Sydney Opera House, constructed in or about 1966. So far as Subterranea Britannica is concerned, he and his firm played important parts in London's World War II air-raid shelter design, as well as the construction of the 'Mulberry harbours' for the D-day landings in Normandy.

More recently Arup Geotechnics produced a monumental multi-volume report on mining instability in Great Britain, commissioned by the Department of the Environment, and have been concerned with the construction of London's Crossrail line and tunnels. The exhibition, 'The engineering of the world: Ove Arup and the Philosophy of Total Design', concerns both the architectural and the engineering aspects of Arup's work. It is the first such celebration of engineering celebrated at a major national cultural institution since one seventeen years ago at the Pompidou Centre in Paris.

SOURCE: WYNNE, Alexandra, 2016, Celebrated pioneer: civil engineer Ove Arup's work and legacy are celebrated at London's V. & A. *New Civil Engineer,* September 2016, 509–51.

Old reservoir in Devon could be turned into a home

Howard Coakley is the man who wants to live in a concrete underground tank that once held more than 100,000 gallons of water. College tutor Mr Coakley bought the 190-square-metre underground reservoir from South West Water on a remote site in Totnes five years ago and has been trying to get permission to turn it into a new home ever since.

So far two of his planning attempts have failed but Mr Coakley is hoping it will be third time lucky with his latest planning application for the change of use of the reservoir to 'residential'. Mr Coakley wants to convert the huge concrete tank into a three-bedroom 'bungalow' which will be mostly buried underground.

'It will be very easy to convert,' said Mr Coakley who lives in Brixham. 'All the walls and the roof are already there and it is a bit like a nuclear bunker. It is partly underground but the walls are a metre thick and inside it is reinforced with pillars. It would be a three-bedroom housed on one level. A bungalow – but very strongly built.'

Top of the reservoir

In January his dream came a step closer when Totnes Town Council's planning committee said it had no objection to the change of use proposals. But he will have to wait until South Hams Council's development management committee has considered his application before he gets a final decision. The old King George V water reservoir – now renamed King George V House by Mr Coakley – lies on a raised site with sweeping views across the countryside and Totnes.

The 2.5m-high reservoir, built to hold more than 100,000 gallons of water drawn from the Avon reservoir on Dartmoor, was constructed in 1926 to supply water for the whole of Totnes. It became redundant and South West Water sold the site. When it was built the water tank was almost wholly underground and only accessible through hatches at the top.

SOURCE: *Totnes Times*, 18 January 2017.

New and very convenient subterranean bar in Kentish Town, London

The Ladies & Gentlemen cocktail bar opened around two years ago in a former subterranean public lavatories in Kentish Town. A surviving wall-mounted sink is now reported to be an 'alcohol fountain'. The proprietor, William Borrell, is currently in discussions about a similar development outside the Ritzy Cinema in Brixton.

SOURCE: BUTTER, Susannah, 2016, Vodka revolution. *Evening Standard*, 24 August 2016, page 29.

Underground hotel to be built in London

Permission was granted in December 2016 for developers to build a 166-room windowless hotel fifty feet below the streets of Bloomsbury. The project's backers have described it as "innovative" and "exciting", and argue it will make the best use of limited space in the crowded capital.

The 166-bed hotel can be built on the site of a converted former NCP car park underneath St Giles Hotel in Great Russell Street. But councillors and traders said the hotel, to be built over two floors of an underground NCP car park, would "let down the West End".

The project was initially rejected by Camden Council's planning committee, which cited concerns over air quality, but the appeal has been upheld and building work could start in 2017. The Bloomsbury Association, which represents businesses in the area, claims "It will

Artist's impression

also place unnecessary pressures on the quality of life and well-being of adjoining residents. It sets a sad precedent for the expansion of London's tourist economy taking precedence over the well-being of its residents."

Soho Councillor Glenys Roberts said that tourists and visitors would be treated "like a bunch of troglodytes in an underground cave", adding the project was "letting down the West End." Planning Inspector David Prentis, who upheld the appeal by Savills, on behalf of investment firm Criterion Capital, said: "Visitors to London have a wide choice of hotel accommodation. Perhaps some would choose not to sleep in an underground room. However, others may well decide that the benefits of a highly accessible location, close to numerous visitor attractions, would outweigh the absence of a window."

While new to the UK, Spain, Greece, France and the United States all have subterranean hotels, some charging as much as £170 per night. Turkey boasts at least seven cave hotels, all built in the Cappadocia region in the centre of the country where troglodytes originally settled.

SOURCE: *Daily Telegraph,* 24 December 2016.

Speleotherapy in 'salt caves' in London

Speleotherapy has long been popular in Eastern Europe even at government level. Your scribe, for example, once visited the subterranean ward of the State Allergological Hospital at Solotvina, near the Romanian border in Ukraine.

There is now a new trend in 'mega-basements' in London with the inclusion of a 'salt grotto' alongside the subsurface bars, cinemas, gymnasia, spas, and swimming pools without which no millionaire's home would be complete. The cited report features such an attraction below a seven-bedroom mansion in St John's Wood, noting that a nearby property has planning permission for something similar. Keeping up with the Jones's is alive and well!

Practicalities are not described, although the accompanying photograph possibly suggests salt-encrusted walls and, perhaps, floor, if not a habitable space entirely consisting of a hollowed-out huge mass of rock salt! It is stated that salty air was appreciated for its health-giving properties in ancient Greece, and that modern speleotherapy derives from the observation of a Polish health official in 1854 that salt miners 'suffered remarkably little from lung diseases'.

SOURCE: PRYNN, Jonathan, 2017, For the healthy wealthy, a salt cave at £20,000 pcm. *Evening Standard*, 6 January 2017, page 32.

Someone could be trapped in Derby's sewers, claims tunnel expert

A tunnel expert fears strange sounds coming from Derby manholes could be a sign someone is trapped underground. Derek Palmer has spoken out after fire crews were called to investigate mysterious knocking sounds near Market Place on 8 March.

Two crews and a major rescue unit were called to reports of "knocking and banging coming from one of several manholes in Tennant Street", near Quad. No one was found. Then later that night Derbyshire's fire service revealed its crews had been searching for children stuck in the drains.

Retired drainage and demolition boss Mr Palmer worked for the city council for fifty years and says he knew of two workers who were carried almost a mile from Markeaton to Darley Park via sewers after freak rainfall. Mr Palmer said if someone had managed to get inside a manhole in Sadler Gate they could have been carried by sewage currents across the Market Place and towards Tennant Street. He said: "That's definitely possible if someone was working in Sadler Gate and got washed away down the sewer towards the Quad. If it was me I would be banging like hell. It has happened before. Going back a while ago, we had two guys washed from Markeaton Lane near the paddling pool to Darley Park. They were down in two big pipes sheltering there as it was raining. There was a thunderstorm and water came down quickly and they couldn't get up. They got washed down into the culvert straight through to the river at Darley Park."

Sewer junction in the Markeaton Interceptor

Mr Palmer described how he used to ride a canoe through the city's sewers before new housing estates made the underground system too treacherous. The journey used to take him and a colleague from a manhole near the Market Place all the way to Raynesway. He said: "I could do that before health and safety came in. There was only about 2ft of water fifty years ago. Because housing estates have been built it's a lot more full and we couldn't send men down there."

While the city's sewage system is filled with water and is not usually accessible by the general public, there are many walkable tunnels which run around Derby and under the Market Place.

SOURCE: *Derby Telegraph*, 9 March 2017.

Living, more or less, underground, at home or abroad

A short newspaper feature recently carried brief illustrated descriptions of several 'underground homes', ranging from earth-roofed dwellings with windows overlooking views from sloping hillsides to rock-cut houses excavated into cliffs. That of most likely appeal to members of Subterranea Britannica is at Matera, Basilicata, in southern Italy.

The city of Matera, we are told, has rock-cut 'caves' which a century ago were homes for 20,000 people 'and their animals'. These are now being converted into homes, cafes, and a boutique hotel. One such 'cave' with a floor area of 1,200 square metres is for sale for £1.08m, but conversion to a twenty-room dwelling would be an additional cost to the purchaser.

Underground home at Marigny Marmande

At Marigny Marmande in the Loire valley in France, an area possessed of numerous cave houses, a property offered for £718,000 is described as having a central 25m swimming pool reached by a stone spiral staircase leading to a tunnel, along with an excavated living room shaped like a four-leaf clover, a grotto with hand-carved gargoyles, and an 'outdoor cave bedroom'. At Galera in Andalucia in Spain £58,000 will buy you a standard house-front behind which lies a rock 'cave' dwelling.

Currently on the market for £760,000 in the UK there is a home at Nether Wallop near Stockbridge in Hampshire below the garden of which lies a 'Second World War bunker'. Finally 45 acres of lakes and parkland near Headley, also in Hampshire, priced at £2.25m on which for an additional £1m you could build a turfed-over 'country house of the future with 6,774 square feet of floor space'.

SOURCE: *The Guardian*, 5 November 2016, page 50.

Hot water, possibly 'on tap', from underneath Newcastle-upon-Tyne

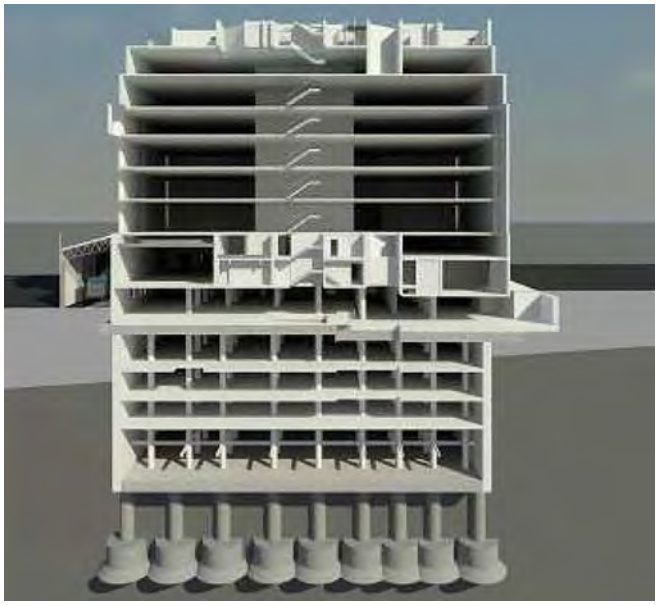
A borehole drilled to a depth of 1,821 metres below Newcastle encountered a bed of sandstone at least 376.5 metres thick below 1,400 metres of other rock. Salty groundwater at a temperature of 73° C was recorded. Although the rock itself, although porous to a degree, is not highly permeable, whether or not any economically useful volume of hot water could be pumped up will depend on whether or not there is a sufficiently extensive network of fracture through which it might flow at a sufficient rate, a question still to be investigated.

SOURCE: YOUNGER, Paul, *et al*., 2016, Geothermal exploration in the Fell Sandstone Formation (Mississippian) beneath the city centre of Newcastle-upon-Tyne, UK: the Newcastle Science Central deep geothermal borehole. *Quarterly Journal of Engineering Geology and Hydrogeology* 49 (4), 350–363.

Five-storey basement for Claridge's hotel gets council approval

Claridge's hotel in London has been granted permission to build the biggest basement in the UK because it will 'enhance the capital's reputation as a luxury destination'. Permission has been granted for the 20,000 sq ft project by Westminster City Council despite its recent crackdown on basement extensions. A five-storey area will be added on to the bottom of the hotel, in a design that somewhat resembles an iceberg.

The new floorspace will include a swimming pool, in-house chocolatier, wine cellar, gym, conference centre and bakery at the 203-room hotel, where rooms can cost from £480 per night. Owners, the Maybourne Group, argued the new facilities were 'must haves' for a modern-day luxury hotel, and the council planners agreed it was important to allow Claridge's to keep up with competition from around the globe.



Plan of the proposed 5-storey basement

Robert Davis, deputy leader and cabinet member for the built environment, said the council was 'proud of Westminster's reputation as the home of luxury' adding, 'Additional basements on an already major refurbishment of the historic Claridge's hotel in a commercial part of the city was regarded as proportional given the enhancement to this world-famous, world-class hotel. Plans for the

basement have been approved alongside a general extension which will see forty more rooms built on two new floors at the hotel.

SOURCE: *MailOnline*, 7 December 2016.

Two unknown pyramids found inside a third one, Mexico

Pyramids, like some Cold War bunkers, are generally above-ground structures, but nevertheless contain man-made voids of interest to members of Subterranea Britannica. These grandiose structures are especially well known in Egypt, but are also found elsewhere, especially in Mexico.

Investigations at the Kukulkan pyramid in eastern Mexico have revealed that it contains a second pyramid, inside which is a third. The visible exterior of these nested pyramids is about thirty metres high and is thought to have been built some time between 1050 and 1300 AD, so much later than the Egyptian structures. The presence of a second pyramid, 20 metres high, inside the first has been known since the 1930s; it is thought to date from 800 to 1000 AD. The innermost pyramid, ten metres high, has recently been detected by non-invasive scanning, and is thought to have been built at some time between 550 and 800 AD.

SOURCE: ANON, 2016, Maya pyramid found in larger one 'like Russian doll'. *The Guardian*, 18 November 2016, page 26.

NEWS – PUBLICATIONS

It should be noted that most books reviewed in *Subterranea* have been purchased privately by the reviewers. Subterranea Britannica does not receive free copies from the publishers.

Church crypts in the Cities of London and Westminster

DETAILS: JOHNSON, Malcolm, 2013, *Crypts of London*. Stroud: The History Press: 224pp [ISBN 9781-86077-672-4] £16.99.

By the early 18th century the City of London had seventy churches with crypts, thirty-one of which no longer survive, whilst the City of Westminster has now twenty of the twenty-five recorded since 1666.

The 'great fire' of that year destroyed a large area of the historic heart of London, including the two cities. The medieval St Paul's Cathedral and numerous churches were destroyed by fire in a few days in September. Some were rebuilt, largely to the designs of Sir Christopher Wren, including of course the new St Paul's. Most of the crypts have a floor area more or less the same as that of the main church, although few feature in published architectural works.

The purpose of the crypts was to allow for the interment of wealthy parishioners within the church, to the financial advantage of the clergy, churchwardens and vestries. By 1800, 79 of these crypts contained the remains of former Londoners. Interments below London churches ended in the 1850s, since when 52 crypts have been cleared, and five partially so. Many crypts since then have found secondary uses for, amongst other things, air-raid shelters, cafes, chapels, medical centres and museums. Malcolm Johnson's book provides details of these subterranean spaces and their histories and current uses, as well as fascinating details of how rapidly bodies and coffins decay, and the removal and relocation of the remains from their supposed final resting places.

Two of your scribe's favourite London crypts, fully open to the public, are at All Hallows by the Tower in Byward Street, where an odd little museum houses *in situ* fragments of a Roman tessellated floor and later finds, and St Martin-in-the-Fields, Trafalgar Square, where an excellent lunch is served.

Engineering history of railway tunnelling under London from 1805 to date

DETAILS: BADSEY-ELLIS, Antony, 2016, *Building London's Underground*. Capital Transport Publishing Ltd: 376pp [ISBN 9781-85414-397-6] £30 hardback.

Your scribe realises that, within minutes of opening this volume, this is a book he has long been waiting for. Whereas there have been numerous books dealing with the architecture of London Underground's surface station buildings, the general history of the system, the signage and maps, and so forth, those interested in the whys and wherefores of the location, routing and creation of the various categories of subsurface tunnelling and associated shaft-sinking have generally had to track down widely scattered originally published technical papers of professional bodies such as the Institution of Civil Engineers. The author of this highly recommended volume has consulted many such primary sources, and presented an accessibly written and well-referenced overview.

The scope of this immense work extends from early tunnels commenced but not, or not at first, intended for railways. These include, remarkably, Richard Trevithick's early but uncompleted tunnel under the Thames, and Marc and Isambard Brunel's ill-fated 'Thames Tunnel' which took many years to (almost) complete but never served its initial purpose as a conduit for road traffic: it provided for pedestrians until the 1860s when it was adapted for rail traffic (now part of the London Overground lines).

The Brunels' partial success with the Thames Tunnel, through which no horse-drawn carriage or cart ever travelled, depended on father Marc's invention of the tunnelling shield which offered the tunnel-miners some protection from premature burial whilst digging, and whilst a tunnel-lining was installed behind them. Although the concept has been credited to the ship-worm *Teredo*, which tunnels though wood in this way, Marc's approach was not to create a circular-section tunnel, but to excavate a rectangular cross-section void largely filled with brickwork within which two parallel running tunnels were formed.

The volume of rock or soil excavated greatly exceeded the actual volume of the useful space created. So far as

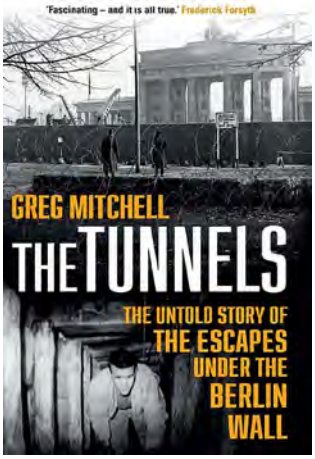
your reviewer is aware, no other tunnel was ever made with the sort of 36-cells shield design used. More efficient circular-section tunnelling depended on the invention of cylindrical tunnel-boring machines for which (for ventilation purposes) only electrically driven boring machines were practicable, and available only much later in the nineteenth century.

There is far more to the London Underground than miles of approximately horizontal tunnels. Sub-surface public access tunnels at stations, vertical lift shafts, and inclined shafts for escalators, are all considered. Replacing lifts by escalators brought practical problems as, with lifts, station buildings were more or less vertically above the platforms. But escalators in shafts inclined at 30 degrees to the horizontal resulted in that not being the case, unless escalators were built in two flights, the second doubling back on the first.

The story is brought right up to date with accounts of modern and continuing expansion of London's underground railways.

Escape tunnels under the Berlin Wall, Germany

DETAILS: MITCHELL, Greg, 2016, *The tunnels: the untold story of the escapes under the Berlin Wall*. London: Bantam Press: (10) + 383pp [ISBN 9780-59307-596-8]



After the end of World War II, Germany was divided into eastern and western zones under the influence of the Soviet Union and the Western allies, the two zones functioning as separate states for over fifty years. Berlin, wholly within East Germany, was itself divided likewise into eastern and western sectors.

East Berlin was under Communist Party control, while West Berlin was divided (from north to south) into French, British and American sectors. Travel between West Germany and isolated West Berlin was restricted to regulated transits by train, by autobahn, or by flights to and from the two airports in the western sector. Despite strict travel restrictions, by 1961 2.8 million East Germans had fled to the west. The Communist authorities closed the 96-mile border between West Berlin and East Germany from 13 August 1961, heavily guarded barbed wire in course of time giving way to a massive concrete wall.

This book, which it is claimed 'adheres strictly to the historical record and witnesses', deals with escape tunnels and attempts made under the wall. It is a readable account featuring especially tunnels into the French Sector at Bernauerstrasse, into the American Sector at Kiefholzstrasse and Heidelbergerstrasse, and the Wolfswerder tunnel from outside the city into the American Sector.

The city-centre British Sector had only a very short length of the wall, about two miles either side of the Brandenburg Gate. The 96-mile wall extended underground, with barriers erected in the sewers and metro tunnels. The border was reopened, almost by accident, on 9 November 1989. Communism fell, and Germany was reunited on 3 October the following year.

NEWS – TUNNELS AND TUNNELLING

Crystal Palace Subway reopened, south London

It was reported in late 2016 that the Friends of Crystal Palace Subway were in discussion with officers of the London Borough of Southwark with a view to timetabled public access on a limited scale in 2017. The access gate at the western (Southwark) end of the Subway was ceremonially reinstated on 8 September 2016. It is reached by way of steps down from Crystal Palace Parade.

The Subway is listed in the Historic England 'Heritage at Risk' Register, and is a Listed Building. Something like two million pounds is needed to make the structure fully safe for public visits. Access via the east end, in Crystal Palace Park (London Borough of Bromley) is not apparently currently in prospect as the staircases and their side walls down to the Subway are in a potentially dangerous condition. The spectacular vaulted Subway with polychrome brickwork has been fully described in a previous edition of *Subterranea* (36, August 2014).

SOURCE: ANON, 2016, Historic subway reopened. *Norwood Review* 215, 8–9. [See: www.cpsubway.org.uk]

Mail Rail passenger carriages delivered to Mount Pleasant, London

Purpose-built passenger carriages have been lowered into the depot / workshop area of the former 'Mail Rail' or Post Office Railway, for assembly and service when the new subsurface museum opens to the public in 2017. The carriages have lowered floors to allow passengers a comfortable journey through the seven ft diameter tunnel loops at either end of Mount Pleasant Station.

SOURCE: ANON, 2016, Mail Rail resurrection. *Modern Railways* 73(818), page 46.

Light at end of the tunnel for scenic Gwynedd path

Work on clearing a passage that will create an off-road Lôn Las Ogwen path through some of Gwynedd's most scenic countryside is nearing completion after a twenty-year wait. The blocked-up former railway tunnel between

Tregarth and Bethesda will give an uninterrupted route between Bangor and Bethesda. Work completed included securing a rock at the side of the ravine, illuminating the tunnel which is 275m long and steps to safeguard users on the viaduct over the Ogwen River.

Since the 11-mile-long Lôn Las Ogwen path was opened, cyclists and walkers have been forced to walk along the main A5 road for a mile-long detour. It is estimated that as many as 100,000 journeys are made on it every year. With the new opening of a path between Tregarth and Bethesda in 2014 the goal was almost complete apart from the 450m through the old Dinas railway tunnel near Tregarth. The work has been funded by the Welsh Government and Gwynedd Council.

SOURCE: *BBC News Wales,* 11 March 2017.

Proposals for improved rail links to Heathrow Airport, London

Heathrow Airport has satisfactory direct rail links to central London, with a slow (London Underground Piccadilly line) or fast (Heathrow Express to Paddington) option, as well as buses or taxis. But it lacks convenient rail links to the rest of England. Suggestions have been published for direct links to Reading where there are rail services to the Midlands and the west of England, and to southern England via Guildford and Woking. The suggested Reading link would be provided by a loop on lines from Paddington via Heathrow to Reading.

As a great many would-be air passengers drive to Heathrow via heavily congested motorway links, and as coach services linking to the airport charge premium-rate fares, it is thought that the cost of installing better rail links would be a worthwhile investment both financially and in terms of travelling comfort and convenience. Some new railway tunnelling would be needed in the immediate area of the terminals.

SOURCE: STOKES, Chris, 2016, Heathrow Southern Railway: a new opportunity. *Modern Railways* 73(818), 69–72.

Proposals to extend the Waterloo & City line, London

The Waterloo & City railway, affectionately known by its users as 'the Drain', is entirely subterranean, and has for about 120 years operated trains under the Thames from below Waterloo main line station to a northern terminus at Bank, where passengers can transfer to London Underground services on the Central or Northern lines or (by way of a long subterranean walk) on the District & Circle lines at Monument. There are no intermediate stations.

Tim Lidbetter has commented in a letter in the September 2016 issue of *Modern Railways* on suggestions that this self-contained railway with only two stations might usefully be extended northwards or southwards. He dismisses such suggestions as impracticable on account of the contexts of the termini.

Tunnelling directly northwards from the Bank terminus is ruled out on account of London Underground stations and tunnels being in the way. Extension here would require the Waterloo & City tunnel to be diverted and a new station provided (leaving yet another disused underground station to add to the list).

At Waterloo, the Waterloo & City line tunnels and station are aligned northwest – southeast below the main line platforms with, beyond, the subsurface depot on the Lower Marsh side of the surface station (where the top of the shaft used for lowering or raising rolling-stock can be seen). Lidbetter comments that the subsurface alignment is inappropriate for any useful extension. There are also, of course, three London Underground lines and stations already under or near the main line station.

If extending the Drain to additional stations at either end attracted more travellers, the present four-car trains would have to be lengthened, as would the depot and termini to accommodate them. And an intermediate station at, say, Blackfriars would also necessitate longer trains, as in the rush hours, the carriages are already packed to capacity.

Lidbetter concludes that extension 'if it were easy … would probably have been done many years ago'. As driving running tunnels is relatively inexpensive compared with lengthening or replacing sub-surface stations, it would be altogether cheaper to build an entirely new line, perhaps leaving yet another abandoned tunnel under the Thames, available as with others already, for some alternative use such as power or communications cables.

SOURCE: LIDBETTER, Tim, 2016, Drain debate. *Modern Railways* 73 (816), page 49.

Proposed extension of the Bakerloo line from Elephant & Castle to Lewisham, London

Transport for London is to hold a second public consultation on extending the Bakerloo line from Elephant & Castle to Lewisham via two new stations in Old Kent Road, then an interchange at New Cross Gate.

SOURCE: TRANSPORT FOR LONDON, 2016, Bakerloo to Lewisham by 2029. *Modern Railways* 74 (820), January 2017, page 13 [published December 2016].

London Crossrail (Elizabeth line) more than 75 percent completed

Tunnelling on the new cross-London line is now almost completed. Civil engineering work at Acton has provided a 'dive-under' by excavating 34,000 tonnes of earth or subsoil to allow passenger trains to by-pass long freight trains routed into the nearby goods yard. Most of the remaining Crossrail work to be done is concerned with laying track, completing ventilating plant, installing signalling, and fitting-out stations with escalators, ticket barriers and the like, and ancillary rooms for staff and plant.

SOURCE: HARVEY, Dan, 2016, Civil work draws to a close. *Modern Railways* 73 (816), page 95.

Eurasia road tunnel opens, Turkey

The Eurasia Tunnel linking Europe and Asia opened on 20 December 2016. Its construction marks a watermark for Turkish infrastructure that will significantly improve commuting times for citizens and businesses in Istanbul.

The tunnel will allow vehicles to cross from Europe to Asia, and vice versa, simultaneously.

The Eurasia Tunnel is an underwater road tunnel crossing the Bosphorus strait. The 14.5km tunnel connects Kazlıçeşme on the European side and Göztepe on the Asian side of Istanbul with a 5.4 km section under the Bosphorus. Designed and built to help reduce Istanbul's traffic problems, the tunnel is about 1km south of the undersea train tunnel at Marmaray. The new tunnel and route will reduce travel times by 85 minutes.

The entrance to the Eurasia Tunnel on the Turkish side of the Bosphorus Strait

Originally conceived in 1997, the Eurasia Tunnel formed part of the Transportation Master Plan. Building on this plan, a pre-feasibility study was undertaken in 2003 for the new Bosphorus crossing. A tunnel solution was recommended as the most realistic option. Construction began in 2011 with an expected total cost of $1.25 million. Tolls will be collected from counters between each lane. These will be automatic systems, no hard cash, significantly reducing the potential for traffic build-up.

As Istanbul lies in a seismically active region the tunnel has been designed to resist a 7.5 magnitude earthquake. Designers claim the tunnel would be undamaged in the event of a once-in-500-years earthquake. Operations can be resumed "with slight maintenance works" in the event of a once-in-2,500-years earthquake. Designers claim the tunnel to be tsunami resistant with potential use as an underground bunker.

SOURCE: *Interesting Engineering*, 21 December 2016.

The closed railway tunnel at Tunbridge Wells, Kent

Tunbridge Wells once had two main line stations, Central and West. The first of these, still in use, lies on the Charing Cross to Hastings line, between double-track tunnels at the north and south ends. A former single-track line in tunnel once connected Tunbridge Wells Central to the former Tunbridge Wells West station, but was closed in 1985. The substantial and handsome West station is now in use as a licensed restaurant. Close to it is the station of the Spa Valley Railway, a 'heritage railway' operated as a tourist attraction, with trains to and from Groombridge.

The Wealden Line Campaign presses for the re-establishment of through services to and from London via the Central and West stations, with connections to the south coast, and via East Grinstead to Croydon and London via Oxted.

The west portal of Grove Tunnel in March 1986. Photo Nick Catford

The connecting tunnel at Tunbridge Wells remains available for use although rail access is at present blocked by a Sainsbury's store and car park built over part of the track. There is support locally for reopening the closed link between the two stations and it is reported that Sainsbury's has provided a written commitment 'to remove structures blocking the route' should reopening be proceeded with.

SOURCE: WEALDEN LINE CAMPAIGN, 2016, Support for BML2 main line to Tunbridge Wells. *Missing Link* 50, page 3.

Proposals for a road tunnel at Stonehenge, Wiltshire

Stonehenge is much more than a circle of stones. It is a focal point in an extensive and largely unspoiled archaeological landscape, rich in its own right with archaeological traces. With the exception, principally, of the A303 Basingstoke to Honiton road, visitors can appreciate this World Heritage Site landscape as it was seen by those who erected the stones. People come from all corners of the world to appreciate this landscape.

There is now general agreement that the A303 should be removed from the immediate landscape close to the stones, by relocating it to a new road tunnel. The debate has, therefore, largely moved on to considerations of the desirable length of such a tunnel. Whilst the tunnel itself can no doubt be driven safely below the top few metres of the land surface, well below any archaeological evidence, digging it at and from the portals will inevitably destroy archaeological evidence, which in itself is much more than artefacts.

Modern archaeology concerns itself as much with environmental evidence such as pollen in the soil, and preserved soil surfaces and traces of ancient cultivation, as with stone implements. Ideally, too, the surface road should be sufficiently distant from the stones to make the incessant roar of motor traffic as unobtrusive as possible. Aural as well as visible intrusion is to be considered. The

National Trust currently takes the view that a road tunnel at least 2.9 km long is required. Road tunnels of any length are far more expensive per kilometre to drive and to operate than railway tunnels as they require elaborate ventilation on account of the air pollution resulting from the internal combustion engine.

SOURCE: NATIONAL TRUST, 2017, Stonehenge tunnel. *National Trust Magazine* 140, Spring 2017, page 12.

Tunnels or no tunnels at Cirencester, Gloucestershire

Those who have read numerous, sometimes well-researched, histories of English parishes can well conclude that no self-respecting parish history can be considered to be complete without an alleged 'secret tunnel'. Some of these are clearly preposterous, such as supposed tunnels linking the 'caves' at Beddington with those at Waddon or the Old Palace at Croydon in south London. Tunnelling from one place to the other would pass through waterlogged gravel and chalk, and below the springs feeding the river Wandle.

On the other hand, preposterous and seemingly quite pointless sets of tunnels certainly exist, witness Joseph Williamson's burrowings at Liverpool, and the Eastry 'caves' near Deal in Kent. Dedicated devotees of underground space quite rightly make it their business to follow up any and all rumours of tunnels.

Jon Maisey, for example, has looked into an article in the *Wiltshire & Gloucestershire Standard* in January 2015 in which a supposed network of tunnels under Cirencester was referred to. With BBC Radio Gloucestershire taking an interest, and following a site interview in the town, entry to a shop cellar was gained and an alcove examined where a tunnel had supposedly been blocked up. Consideration of all observable evidence, and especially of what would be found in the path of any tunnel, led to the conclusion that this one at least is almost certainly fiction.

SOURCE: DUXBURY, Joe, and Jon MAISEY, 2016, Tunnels under Cirencester. *The Journal [Newsletter Gloucestershire Spelaeological Society]* Spring 2016, 3–4.

Proposed route for HS2 could lead to ground collapse

A proposed section of the HS2 rail line, to be built over a former mining area, will be at "high risk" of ground collapse, according to a report.

The vast expanse of the Winsford salt mine; photo taken during the Sub Brit visit in August 1997. Photo Nick Catford

The £56bn network will cross part of Cheshire undermined by salt mining and notorious for subsidence. A report on "salt-related ground stability" by HS2 Ltd, which oversees the project, says the line will also cross Britain's biggest active salt mine, at Winsford, where digging is planned to extend its workings. The report warns of "the potential for the rapid development of significant movement" in this area under the weight and vibration of trains, "with a consequent risk rating as high". It identifies five more salt-mining or brine extraction sites near the town of Lymm where it classes the risk as red, the highest, and fourteen more locations where it is amber, the second highest.

Salt mining, which has gone on in Cheshire since the 17th century, involves hollowing out vast caves, many not far below the surface. Buildings in the area suffer from major subsidence and have to be underpinned.

The proposed route has been changed once to avoid running over massive underground caverns which could cause a "catastrophic ground loss", the report says. The new route will require the closure and rebuilding of the A556, one of Britain's most congested roads, as well as miles of new embankments and viaducts, adding up to £750m to the cost.

Members of Subterranea Britannica visited a salt mine at Winsford in August 1997.

SOURCE: *Sunday Times*, 29 January 2017.

A river trip underneath Bristol

The river Frome, *en route* to the Severn, flows in culverts under the city centre of Bristol. Subterranea Britannica members who attended a Study Weekend based there some years ago will recall viewing the subterranean water from an access point in the Castle Park. This visible section is in fact not the river, but a covered-over length of the former castle moat. What lies out of sight, and in the river culvert proper, can be seen in a series of photographs accompanying a descriptive article as cited below.

SOURCE: MAISEY, Jon, 2016, Underground with a difference (Bristol, River Frome) *The Journal [Newsletter Gloucestershire Spelaeological Society]* Spring 2016, 21–27.

Moseley Green railway tunnel, Forest of Dean, Gloucestershire

The Moseley Green tunnel is a disused single-bore single-track railway tunnel in the Forest of Dean. The tunnel is locked, and access requires permission from Dave Tuffley at permits@fodccag.co.uk . Wellington boots are advised as in the tunnel portal area the ground is very wet and muddy. Bats encountered should not be disturbed, which includes photography.

During World War II this tunnel was, it is said, used 'extensively' for the storage of ammunition, high explosives, and possibly mustard gas. Some remnants of wartime guards' accommodation survive near the south portal. Heavy steel and timber support structures were installed in part of the tunnel during the war on account of heavy USA military vehicles operating on land above

the ceiling. Four photographs taken underground show the tunnel to be stone-lined and in sound condition.

SOURCE: TAYLOR, Paul, 2016, Photographic trips to Moseley Green railway tunnel. *The Journal [Newsletter Gloucestershire Spelaeological Society]* Spring 2016, 28–34.

Harecastle and Standedge canal tunnel safety features

The death of a boater in the Harecastle canal tunnel on the Trent & Mersey Canal in 2014 has resulted in the provision of additional safety arrangements. Although 'not uniquely long, low, or narrow' the Harecastle tunnel is reported to be 'singular in other respects'. There is a 'tunnel-keeper' at each portal to regulate traffic, with a reversible one-way system, so several boats may be allowed through in one direction, while any coming the other way have to wait until all are safely through. The flow is then reversed. The two keepers are in telephone contact and make sure there are no boats travelling in opposite directions in the narrow tunnel.

However, until recently, it has not been possible to get telephone reception in the tunnel. Emergency calls can now be sent and received within the tunnel. An additional feature is that Harecastle has a mechanical 'complex door system' for ventilation. Britain's only other canal system with 'extra' safety feature is the 3¼ mile Standedge bore, where Canal & River Trust personnel accompany all boats, and boats' progress is monitored by staff in a van driving through the parallel disused railway tunnel (a 'live' double-track railway tunnel remains in use on the other side of the canal bore).

SOURCE: ANON, 2016, Phone reception in Harecastle tunnel. *Waterways World*, April 2016, page 39.

First boat trip through the Hincaster canal tunnel for almost 70 years

The last commercial passage through the 380-yards Hincaster tunnel on the Lancaster Canal was in 1944. Much of the canal is now dry, but water still stands in the narrow tunnel, which has no towpath, and opened in 1817. Two enthusiasts paddled a dinghy through from portal to portal in February 2016. The cited report includes a photograph of one of the portals.

SOURCE: ANON, 2016, Hincaster tunnel sees first boat in almost 70 years. *Waterways World*, April 2016, page 33.

Radical new solution to London's traffic congestion

Like many cities, London has a serious problem with gridlock. According to Eurostat's Urban Europe report, the city has the worst congestion in Europe – an average commuter there spends 101 hours in traffic every year.

An obvious solution to this problem would be to upgrade or expand the existing tube, train, and bus networks to be more efficient and far-reaching, so that more locals use mass transit. But PLP Architecture, a London-based firm, is proposing a more radical idea: moving vehicles underground.

Called the CarTube, the firm's concept envisions an underground tunnel of automated, conveyor belt-like tracks. Cars in the tubes would travel at a steady speed of 50 mph, so there wouldn't be stop-and-go traffic and commute times could be cut by up to 75 percent.

PLP wouldn't disclose an estimate for the CarTube's cost, but said it could be built at a fraction of the price of Crossrail. There are no immediate plans to build the CarTube, but PLP is talking with a number of partners, including Google, about the concept. They estimate that if the Tube were to be built, construction would take less than a decade.

SOURCE: *Business Insider*, 15 December 2016.

Driving the second Ulriken rail tunnel on the Oslo-Bergen line, Norway

The world's busiest single-track railway line, giving access to Bergen in Norway, is being improved by the boring of a 7.6 km relief tunnel between Fløen and Arna. The line forms part of the very scenic route from Oslo to the country's second largest city, and is heavily used by passenger and freight trains, Bergen being a major port.

Alongside the existing single-track tunnel made in 1964 through the Ulriken mountain, a relief tunnel is now being driven through a challenging and complex succession of mostly hard crystalline igneous or metamorphic rocks.

The colossal TBM

The geology demands drilling and blasting for 800 metres to create a large cavern at the Arna end, and the use of a tunnel-boring machine for the remaining 6.8 kilometres. The 'colossal' TBM has a diameter of 9.33 metres and a length of 155 metres. The large cavern inside the Arna portal is to provide additional track capacity to accommodate train stabling and manoeuvring. Drilling and blasting can only be done at intervals as the Arna cavern is very close to the old tunnel. There are four

'windows' of just 35 minutes each between trains on the old line in which drilling, blasting, mucking out, and stability tests have to be done.

Towards the Fløen portal, the TBM had by November 2016 bored 2.1 km of the new tunnel, progressing at 37 metres a day in the less challenging rock types, but as slowly as two metres in the hardest rock sections. The lack of closely spaced fissures in the rock makes extracting rock more problematic. Around fifteen 'teeth' in the cutting heads on the TBM have to be inspected and replaced every day as they wear out rapidly. Rock-bolting is used to ensure stability in the completed tunnel lengths, to be followed by a sprayed fibre-reinforced concrete lining.

Apart from providing a second single bore, the new Ulriken tunnel features 16 cross-passage links to the old tunnel, for access and emergency purposes, three of which include control rooms, and non-rail access tunnels at each end. The access tunnels will provide for emergency and servicing requirements, and at Arna for dismantling and removing the TBM. Diagrams in the cited report also indicate two tunnelled connections from the new to the old line, allowing trains to change lines when required.

Completion of tunnelling is scheduled for Summer 2017 depending on rock encountered in the yet-to-be-bored section. It is hoped, in fact, to have all tunnelling completed by June, when the World Tunnel Congress is to be held at Bergen. Trains will run when all track-laying, signalling, safety and communications equipment has been installed.

SOURCE: SMALE, Katherine, 2016, Mountain challenge: Norway is cutting a 7.6 km rail relief tunnel through solid rock. *New Civil Engineer*, November 2016, pages 50–54.

The world's most expensive tunnel opens in New York, USA

On New Year's Day in 2017 the first major extension of the New York subway in fifty years was ceremonially opened to the travelling public. The Second Avenue subway line was first proposed in 1919, and a start was made in 1972, later abandoned, and eventually recommenced in 2007.

Effectively an extension of the Q Line, this is the first phase of an intended route to Lower Manhattan, with three new stations at a depth of about 100 feet below the surface. The two-mile tunnel, driven in rock by a 120ft-long tunnel-boring machine, cost £1.8 bn per mile to create.

SOURCE: BATES, Daniel, 2017, 98-year wait for train (no, it's not Southern). *Evening Standard*, 3 January 2017, page 25.

Continuing planning for an undersea link between Germany and Denmark

Three great European cities, in three countries, are at present interconnected by a circuitous road link from Hamburg via Jylland (Jutland) in mainland Denmark and the two largest of the Danish islands to København and then the new Øresund bridge to Malmø in Sweden.

The distance can be shortened by taking a ferry from Puttgarden on Germany's Baltic coast to Rødby on one of the smaller Danish islands, the ferry crossing taking around 45 minutes for the 18 km sea crossing. The ferry is also one of the very few left worldwide which also carries passenger trains, so passengers can take through trains from Hamburg to København, and then change to trains across the Øresund bridge to Malmø, this being the route your scribe takes to Subterranea Britannica events in Sweden.

There have long been plans to replace the Puttgarden–Rødby ferry by a fixed link, a bridge or a tunnel, and planning for the tunnel option is now well advanced. The ferry company, Scandlines, unsurprisingly opposes the project as it would lose income from fares, on-board catering, and international shopping trips.

The 18 km Fehmarnbelt tunnel, if or when completed, would be the world's longest immersed tube tunnel, and provide two two-lane roadways and two single-line rail tracks. It would be constructed of a number of reinforced concrete sections made and floated out from the Danish island of Lolland and joined together is a deep trench up to 40 metres below sea level dredged in the Baltic sea floor. The rail link, currently worked by diesel-hauled trains, is to be electrified, allowing through journey times from the German city to the Danish capital of under three hours, of which seven minutes will be spent running under the Baltic.

SOURCE: HENSON, Robert, 2016, Corner cutter: Denmark and Germany prepare to start the Fehmarnbelt tunnel. *New Civil Engineer*, August 2016, 56–59.

The longest road tunnels

Proposals for a new Manchester to Sheffield road link might, depending on the route chosen, mean a new road tunnel from 12 to 15 miles long, greatly exceeding the UK's present longest road tunnel at Hindhead in Surrey, just over a mile long. The world's longest road tunnel is the Laerdal tunnel in Norway.

SOURCE: ANON, 2016, Longest road tunnel. *The Norbury* 519, page 3 [Published by the Norbury & South London Transport Club].

New use for Bradford tunnels

Underground passageways near to Bradford's City Hall that were bricked-up and backfilled in the 1950s have been refurbished and opened to the public after being converted into an ambitious retail and leisure development featuring bars, restaurants and shops. Owner Graham Hall spent three years planning the project and a further three years on its construction, which was beset with delays. But the development was finally opened to the public on 10 December 2016.

In the 1950s the tunnels were used to store bricks and industrial waste. As they began to fill up, walls were built

with the materials behind, gradually filling the space. A part of the tunnel was last in use in 1964 as the Little Fat Black Pussy Cat nightclub – which once hosted a performance from rock act The Pretty Things – but was closed down within a year. The Beatles are also rumoured to have played an impromptu set in the tunnels after a gig at the nearby Odeon.

The entrance to Sunbridgewells

When buying the property, Mr Hall had to negotiate with six different landowners as the tunnels sprawled under different plots of land. He said the owners were not aware that the tunnels even existed.

Bradford Chamber of Trade said the Sunbridgewells project is the latest phase of a renaissance in the city centre, which has included the opening of a large shopping centre and a resurgent bar and pub scene. Graham Hall hopes his project will enhance all the other bars in the area stating, "It's not about competition. In a sense the only way to improve a city is to bring people in." The development is intended to be its own "Victorian quarter" and to promote independent traders.

SOURCE: *Yorkshire Post*, 12 December 2016.

An underground railway made by drug smugglers under the Mexico / USA border

US agents have found a cross-border tunnel equipped with a narrow-gauge rail line made to facilitate the smuggling of drugs from Mexico into California. Reportedly, tonnes of drugs such as cocaine and marijuana were being transported to an exit hidden under rubbish bins in open ground on the American side.

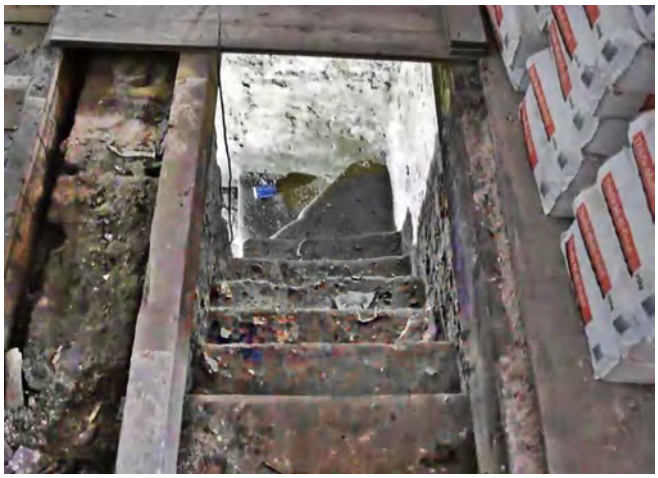
The metre-wide 800-metre tunnel commenced under a house in Tijuana, and ran to a point below a wooden pallet business in San Diego, and was equipped with lighting and ventilation systems. Over a tonne of cocaine and seven tonnes of marijuana were seized. This was the 13th under-border smuggling tunnel detected since 2006. Three had their exits under properties in the same street in San Diego, running parallel with a densely populated area in Mexico.

SOURCE: ASSOCIATED PRESS, 2016, Down a rabbit hole: underground rail used to smuggle to US. *The Guardian*, 22 April 2016, page 27.

Guisborough pub might sit on top of medieval tunnel network

The Monk, a newly opened pub in Guisborough, Yorkshire, might have a secret network of tunnels beneath it. *The Monk* is located in the former Priory Saddlery shop on Church Street, but aside from what's behind the bar, what's underneath has also caused quite a stir.

Legend has it that a network of underground tunnels leads to and from the town's historic priory. Over the years, there's been talk of tunnels haunted by a 'Black Monk' and ones which 12th-century monks would walk through to visit ladies of ill repute, passing on their way a chest of gold coins guarded by a raven.



Now a discovery beneath *The Monk* may suggest the tunnel network is more fact than fiction. During work on the new bar, builders lifted some flooring and found steps leading underground. And to make a feature of the unusual find, the entrance to the tunnel steps has been covered in glass so everyone can peer down into the murky depths.

Steve Hewison, who has opened the bar, said: "It's probably either a priest's hole, where priests used to hide when Catholics were persecuted, a cellar, or it was part of a tunnel network that goes across to the priory. There certainly seems to be part of the wall which has been blocked up, so maybe that led to the tunnel."

SOURCE: *GazetteLive (Guisborough)* , 21 November 2016.

Here Runneth Under

Sam Dawson

Western tunnel of the South Street Caves looking north

The town of Dorking in Surrey has more hidden underground spaces than most visitors (or residents) might realise. Dorking is a smallish market town. It commands the Mole Gap, an invasion route through the North Downs dating back at least to time of the Romans. It's part of the Surrey Hills, and embraces one river, the Mole, and a tributary, the Pipp Brook, whose multiple watermills may have helped give the motto to the town's literally riotous and later suppressed town-wide football match: "Kick away both Whig and Tory; Wind and Water, Dorking's glory".

Looking north over Dorking. The scene is dominated by St. Martin's church

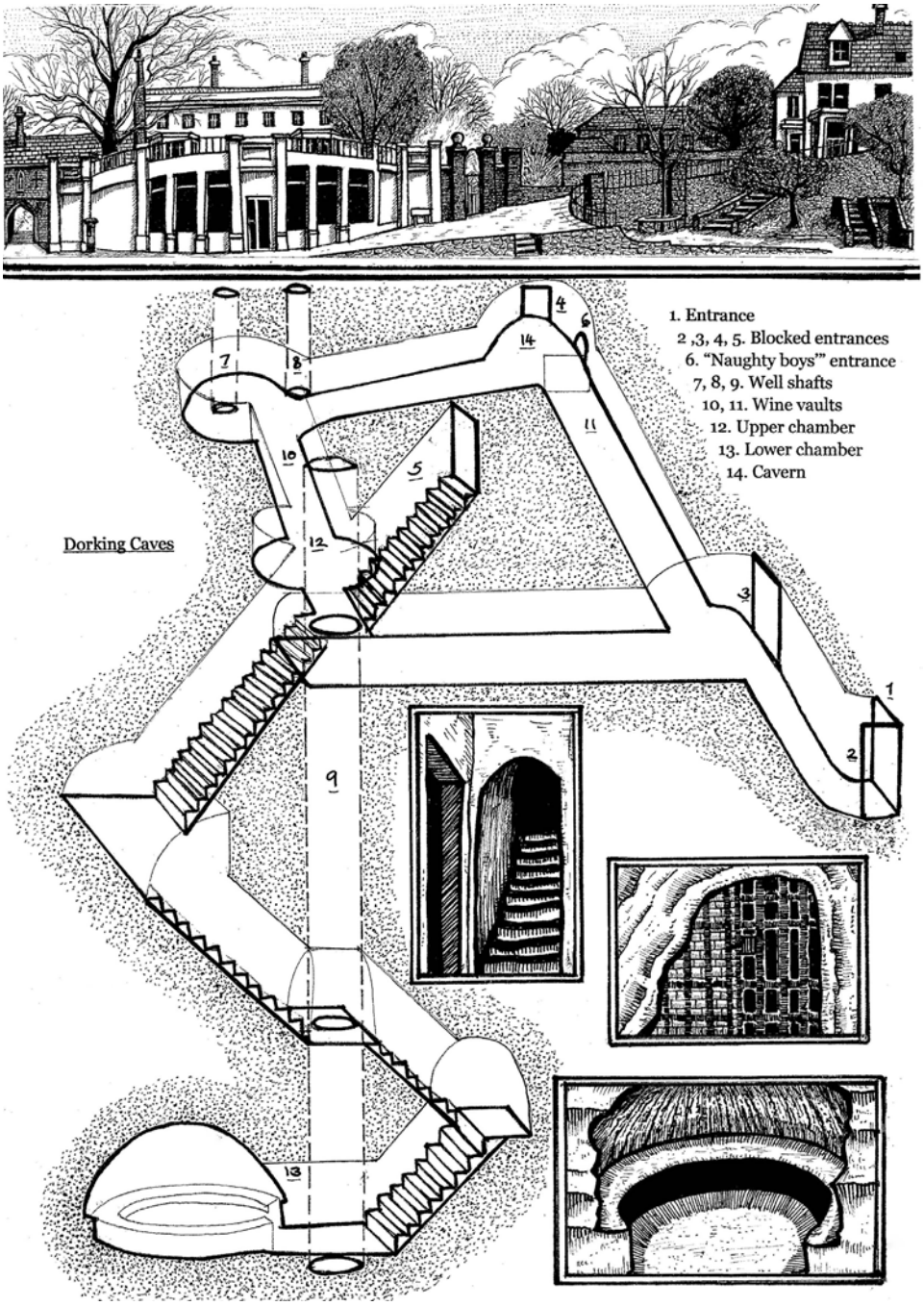
For centuries the town was a staging route between London and the coast (Nelson reportedly trysted nearby with Lady Hamilton on the eve of his departure for the Battle of Trafalgar; Dickens visited the *King's Head* coaching inn, which became the *Marquis of Granby* in *The Pickwick Papers*). As well as being an agricultural centre, Dorking was a major producer of lime, sand and stone. Today it's a pleasant town, known for its independent shops, at the centre of some stunning countryside. And, for disciples of the underground, a complete honeycomb below the surface.

Geology is the explanation. The town rests largely on clay or greensand, a soft but stable sandstone that crumbles

down into individual grains when excavated. It's easily dug. For profit, for storage, even for the bankrupting fun of it.

Jewel in the Crown

The jewel in its subterranean crown is the South Street Caves. This road was, until it was widened in 1919, a narrow, picturesque thoroughfare, clustered with ancient, stepped houses clinging on one side to Butter Hill (the existing West Street is not dissimilar). South Street contained a fine house and gardens, five taverns, a quarry, brewery, meadows, slaughterhouse, town jail and police station. And in the two centuries leading up to the demolitions, the rural slum of Cockchaffer Lane, a distillery, poorhouse, town stocks and pound, the site of the annual Pleasure Fair, dame schools, a harness makers, grocers, tithe barn, butchers, stables, fire station, carpenters and builders. Also the residence of Colour Sergeant Bourne of Rorke's Drift fame, plus the Hole-in-the-Wall, home of the fondly remembered eccentric Major Peter Labilliere, from which his corpse was taken to be buried upside down on Box Hill. Not to mention the houses of two children he paid to dance on his coffin. And many small cottages, among which the caves' entrances were by then concealed and little known.



The caves aren't huge, those at neighbouring Reigate being much larger, but they do have their own particular character. And history; little known, hidden behind a plain door, they tell a story of madness and industry.

Down them once walked, or climbed, their creators. A periwigged and powdered gentleman, labourers laboriously hacking out the soft rock at his command, well-diggers, vintners perhaps wondering what was the latest news from the war against Napoleon. All by the sparse light of flickering flames. And probably all with sand down the back of their necks.

The tunnels cover four periods: the nicely tree-rooted 1921 entry passage; two Napoleonic-era wine vaults; three wells; and the 17th- or 18th-century original staircases and passage which one of them punctures. Those last ones are at the heart of the caves, yet who made them and why remains uncertain. John Timbs, in his *A Picturesque Promenade Round Dorking* of 1822, writes: "Dorking being situate on a sandy rock, abounds with deep and capacious caves or cellars which are extremely cold, even in the height of summer. The most remarkable of these is one on the left side of Butter Hill, which runs for a considerable distance in an angular direction. On the side of the entrance is a wide staircase curiously cut out of the rock and descending by 50 steps to a crystalline spring of water. About a century ago, an individual expended the whole of his property in digging this cave and, having just wasted several hundreds, he is said to have died in the poor house."

The same theory is given *A Hand-Book of Dorking* in 1855: "The large cellars or caves beneath the town, dug out of the sand rock, are highly curious. It is said that more than a hundred years ago, a man was foolish enough to expend all his property in making the largest of these

excavations, at the bottom of which there is now a spring of pure water."

Both books are vague about the date of these first diggings. Whether it's true, and the core excavations were a rich (but soon not to be) man's self-dooming caprice, they are likely to have quite quickly been put to the use that would continue for three centuries and was already well established throughout the town – alcohol storage. The seventeenth-century antiquary John Aubrey wrote that, "In this town, is a great Plenty of Cherries, particularly a wild cherry that Mr John Evelyn tells me makes a most excellent wine, little inferior to the best French claret, and keeps longer; and nowhere are finer Caves for the Preservation of their liquor than in the Sand there".

The temperature in the tunnels is a fairly steady 14 degrees C. Just right for storing wine. That was what led to their enlargement and maybe even their survival. Every house on that now destroyed section of South Street is said to have had its own cave (like all those in the town, dug rather than natural), and all were lost, filled or sealed when the road was widened.

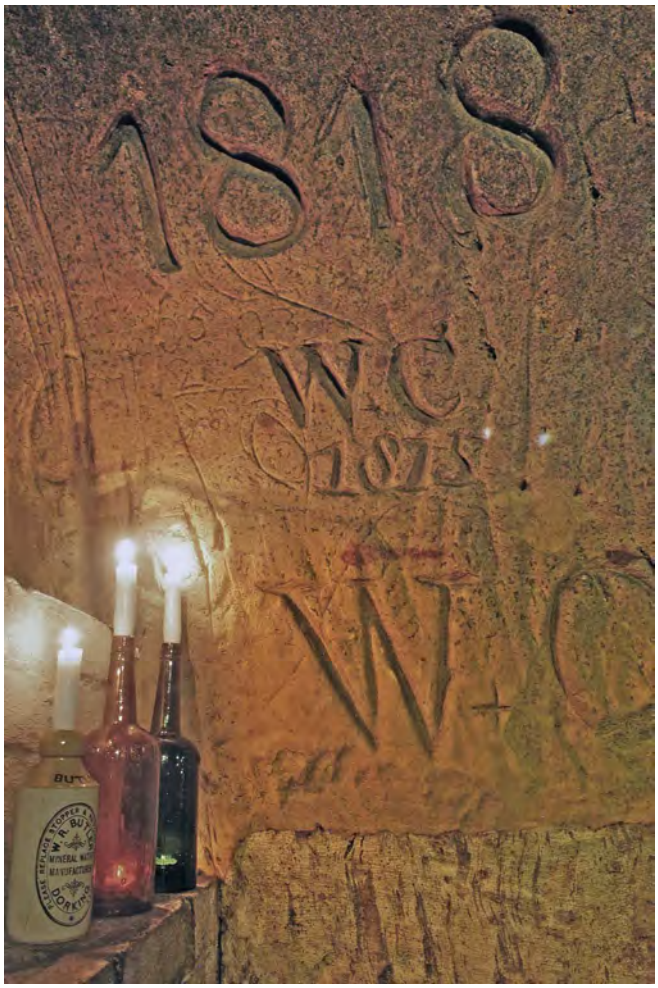
Entrance to the South Street Caves and, behind it, Butter Hill House, home of their alleged creator

Wine (and, much later, grocery) storage is the one certainty about the caves' early use. The folk myth is that they were carved out as a hidden church, or for smuggling, and were linked to a secret underground river, or to Betchworth Castle (nearly two miles away). The rumours tend to centre around the small chamber that is their lowest point. The latter two theories are immediately provable as fantasy, the former two are not impossible as a later use. They are very unlikely, though, as the reason for their creation.

The digging of caves would have produced tonnes of sand that could not have been covertly carried down the by-then increasingly busy street. Unlike in Reigate, deep mining can also be discounted. Greensand was used for glassmaking, water filtration, and in high quality mortar and render. It had real economic value – it could be sold by those excavating cellars to help defray the expense – but it was easily dug from the surface, and the town's geography is still strikingly marked by these large, defunct quarries.

Contraband and Dissent

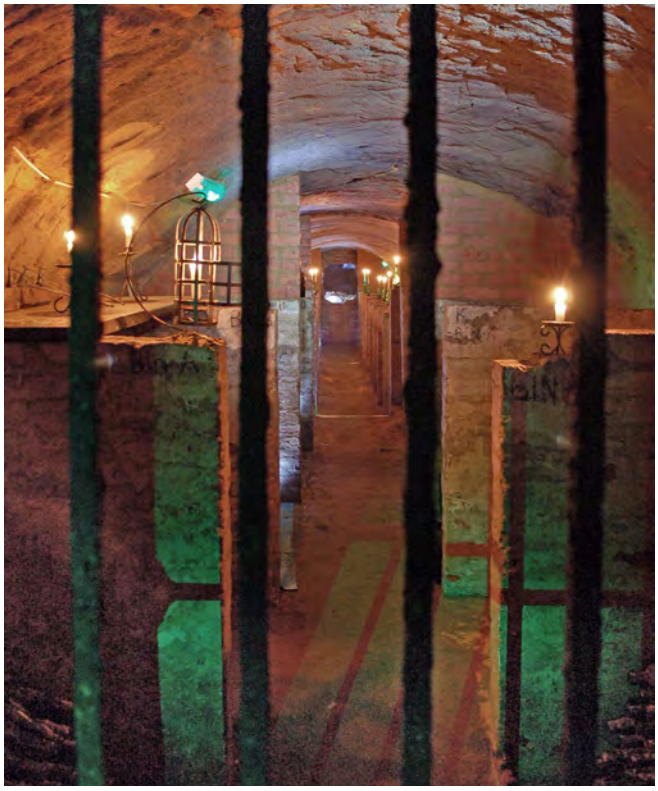
The later hiding of contraband can't be discounted. The neighbouring hamlet of Holmwood was at the time mostly wild swamp and heath and was reportedly involved in the trade, as it was, in highway robbery. So much so that Dorking had its own gallows. The tunnels, with their multiple exits, shielded from the road and giving onto alleyways and secluded gardens and yards, might have been convenient for clandestine ingress or escape. Similarly it is possible that the lower chamber, with its handy spring which could be used for baptisms, might just have found some use for covert religious purposes, albeit for a very, very small congregation.



Dates carved in wine vault

Dorking had a history of rebellion, freethinking and religious dissent. It hosted various nonconformist congregations, but generally in peaceful coexistence with the Church of England and Catholic parishioners. The only exception was the 17th-century millennial sect *The Fifth Monarchy Men*, who were repressed by the authorities as "a menace to the public peace", forcing their leaders into hiding in the town. Perhaps they literally went underground. But if so, probably not here.

In time the Congregationalists, Methodists, Baptists and Strict Baptists would build churches and chapels, while the Quakers would construct a meeting house near the caves that had its own huge storage cavity beneath, replacing an earlier structure, also with cellar, into which an entire congregation of 60 fell when a rotten floor gave way. Meanwhile, wealthy West Street resident and cordwainer William Mullins joined the Pilgrim Fathers on the *Mayflower*, along with his family and 200 boots, but his was an economic decision, not a religious one. A year later he was dead.



Entrance to western wine vault

Guides' 'office', western wine vault

You enter the tunnels through a door kept deliberately nondescript to avoid offering temptation. Open, it covers a bricked-up entrance to another cave. (Probably the one visited in 1973 by Chelsea Spelaeological Society, who were allowed access on condition that they didn't name the residence from which they entered. The house, whose identity is not difficult to guess, had extensive cellars, from which a staircase descended to the brick-floored cave, which was lined with wine bins and had been adapted for use as an air-raid shelter in World War II.)

Western tunnel – the wine vault

Back in the main caves, a short entrance way leads into the northernmost of a rough square of passages, and the caves' older – but not oldest – blocked entrance. It also allows entry, through a rusted gate, into the western tunnel, one of two additions built in or before 1815, according to the earliest carved date, for wine storage.

Like its twin, it's a narrow, arched passage. Within it have been set 42 bricked wine bins, which would have held up to 700 bottles each, in wooden frames. For the arithmetically challenged, this makes the total for the whole complex nearly 29,400 in the bins alone; more, along with barrels, could be held in racks in the passages. Like the rest of the caves, its walls hold sooty recesses for candles or rush lights, and have acted as a magnet for historic graffiti. Here are the initials of previous owners and workers and tally marks easily scarred into the soft walls.

The passage ends in a punctured brick wall that blocks, a little ineffectually, the way to the last corridor of the square, a small, rough cavern. My feeling is that this wasn't actually an intended part of the construction, but rather someone else's cave unwittingly broken into by the digging of the Napoleonic-era passage. This space is that bit rougher, more rounded, cruder. The pick marks are longer and broader. Tellingly, it also has its own sealed and sand-filled historic entrance. Plus a rather smaller and more recent one.

The Naughty Boys

This is what is known as the naughty boys' entrance. In 1960, when the defunct police station and town jail were demolished, a (now replaced) public toilet was planned; the kind of brick-built municipal design seen in thousands of towns. Literally bog standard. On a Friday afternoon the builders suddenly found themselves digging into air. They had pierced the caves, then in their last year of fading commercial use. The workmen, wanting to get home, roughly concealed the hole and left. Over the weekend two sharp-eyed teenage boys did the opposite.

Each of the 42 bricked bays could hold around 700 racked bottles

'Cavern' area with bricked naughty boys' entrance

They were found, hours later, in the nearby Meadowbank Park, so drunk on the bottles of wine they'd taken that the police were called. They were escorted home and the accidental way-in bricked over, but not before the investigating police officer squeezed through the narrow, crumbling aperture to check for any further thefts. By the light only of his petrol lighter he explored the entire complex, with its then perilously eroded steps, alone. In a pleasing postscript, on a public tour several decades later, as the guide reached this point in the story, an elderly man put up his hand and said, "That was me."

From this point it's usual to retrace steps back to the northern corridor, probably dug as the second, things-getting-a-bit-out-of-control stage of the folly. It is arched and on one side has a curious flared shape. It has been conjectured that this might have been to allow a pannier-carrying donkey to be used to carry out the excavated sand (gouge marks made by ropes in the side of the stairs show the weight of the spoil being taken to the surface). More likely though is that the passage was widened in Georgian times to allow barrels to be rolled into position.

At the end of the corridor a cataract of sand and antique broken glass marks an apparently abandoned attempt to make yet another entrance. The failure to punch all the way through to the surface offered a bonus: its brick-buttressed ledge enabled barrels to be positioned there for bottling purposes. It also allows us to look up at a revealed section of the ocean bed of 120 million years ago, complete with the wave marks of the Cretaceous sea.

Junction with stairs down (left), entrance to vintage ports gallery (middle), stairs up to the likely original entrance (right) – and above them all the shaft of the largest of the three wells, which appears at every level of the caves

Stairs to the caves' suspected first entrance

Stairs down to the main well bottom and lowest chamber

The walls here also show traces of glauconite, an ironstone called carstone in Surrey (possibly for its use as chippings when the county's roads were macadamised in the 1920s). It's a saleable, but rusty and less than beautiful stone, unless knapped, or galletted into decorative cubes and inserted into the mortar of walls. A number of Surrey historians believe that this had the benefit of creating a barrier to witches, who would be unable to pass the metal. Certainly witchcraft was taken seriously.

Assizes records from 1655 list the trials of two Dorking widows, Elizabeth Wood and Mary Walker, both indicted for having "bewitched Thomas Bothell, who languished until 4 Apr. following, when he died at St Saviour's, Southwarke". Wood was also charged with having "bewitched Ephraim Bothell, aged 12, who languished until 23 Dec. when he died at D.(orking)". They probably escaped punishment: nine out of ten women arraigned for witchcraft in the county were found not guilty.

From here the passage doglegs to the eastern corridor. A metal plate in the floor allows passage over the grandest of the three wells that pierce the tunnels. It will be met again twice below, and must have worked some magic on the caves' creator, given its ill-advised incorporation into the structure, which not only resulted in gates later having to be added to stop someone climbing down it to gain access to the cornucopia of liquors – but also to the flooding of the caves' lowest and most important chamber.

Subterranean Folly

By the well-shaft a set of steps rises to the inevitable brick wall. This is believed to be the original entrance, sunk from the then substantial gardens of Butter Hill House. Sandstone stairs wear quickly, and these show relatively little use. They give onto a crude, unfinished, circular, benched chamber, the larger twin of the one below at the caves' lowest point, sixty feet below the ground. It can only be a theory, but my personal feeling is that this was the original core of the owner's ambitions: a subterranean folly reached by taking a few steps down from his own grounds. A garden feature, a grotto or hermit's cave. The type of conceit you can find at hundreds of stately homes across Britain, sometimes with a statue of a water god or a lining of shells.

Carved bench in upper chamber

So what happened? If the early chroniclers are right, the caves' construction ruined their creator. He spent the rest of his life in the Dorking poorhouse, which, cruelly, was situated almost opposite, a daily reminder of his pauperising madness. Did he descend to that first circular chamber to admire his handiwork, his private refuge, his unique hideaway, and instead hear a noise? Carts in the road, voices from outside? Or was it insufficiently grand? Something changed his mind. He turned from his original plan and went in the direction that very few of the grotto builders – with the exception of Sir Francis Dashwood and his Hell Fire Caves – did: down. Deep down.

Vintage ports gallery

The stairs downwards are opposite that earliest entrance, just before that first attempted chamber, binned (literally) and left to storage and as an entrance to the later, second, eastern corridor, filled with more storage bays and with its doorway marked “Vintage ports”. This terminates in a rough short space that doubles back to the cavern and the naughty boys’ entrance. But not before passing two more wells which present further riddles.

Well, Well, Well

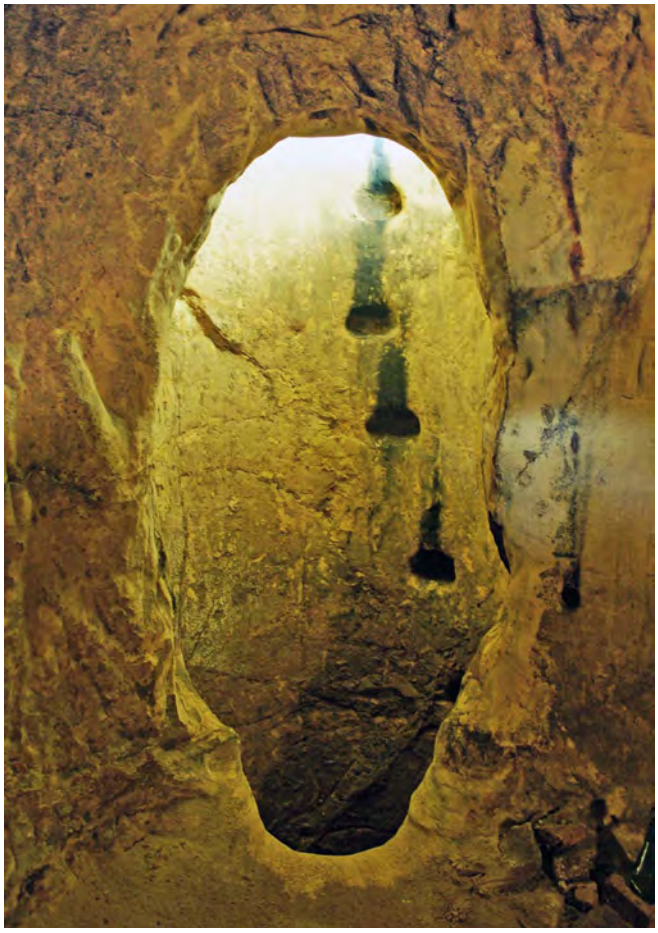
The narrative of the caves relies on the idea of a mansion and garden with an entrance to what lies below. These two adjoining wells sit uneasily with this. It seems reasonable to assume that the three shafts predate the construction of the caves, but it’s not certain. The tunnels have always been little known, elusive, semi-hidden. It’s not impossible that wells could accidentally have been sunk through them – but not the main one, possibly belonging to the big house; there appears to have been a conscious effort to link to it during or after its construction.

But the others? Are they to be supposed to have been from residences surprisingly close to the grand house? They can’t have been too humble; the costs of sinking a well (two minutes’ walk from the town’s main water supply) prove that. Yet they appear to have been discovered only during the excavation of the Georgian vintage ports corridor – and then filled with expensive sand. Was one abortive, could a wine merchant deny households their water supply? Or were they sunk from Butter Hill House, as precursors or successors to the larger-bored well? We simply don’t know.

What we do know is that the suggestion that the three wells are medieval is unsupported. It ignores that the largest is actually dated 1672, and also the fact that there was no known building in the field above until the creation of the first Butter Hill House, over a century after the Middle Ages had ended.

What the wells do provide is a worm’s eye view of how they were created. Their excavation is likely to have been the job of professionals, and a hard, wet, dark and cramped one at that. All three clearly show the alcoves in the sides gouged out as hand and foot holds or to grip the cross-set timbers necessary for the diggers to return to the light at the end of each working day, and which doubled as receptacles for the heavily smoking rushlights or crude candles that illuminated their graft.

Two are filled in at this shallow first level. The other goes all the way down. And beyond. To follow it you descend a further flight of stairs, with a high-ish roof that suggests the stairs were recut each time they became dangerously worn. These lower levels are the most characterful: narrow, darkened, and illuminated by centuries of carvings made by visitors and wine cellar workers. They are surprisingly elegant. Beautifully done, the letters almost all with serifs. Copperplate calligraphy rendered in stone by semi-educated brewers and cellarmen – the initials of the families that leased or owned the caves



One of the two smaller wells

And its shaft going up

feature and reappear in the church graveyard and on the war memorial that neighbours the entrance. And every one carved by the light of a burning wick.

Halfway down is a further cutaway view of the main well. And by it the date 1666. The stairs, with their heavily shadowed names and initials, continue down to the lowest level and the small, domed chamber that marks it, approached through the small antechamber of yet another excavation through to the well which for years drowned it.

A bankrupting act of folly? The caves' lowest and final chamber

Dantean Darkness

This isn't just the caves' lowest point. It must also have been their *raison d'être*. Their crowning folly, a humbly-sized Mithraic nod towards the underworld, a snatch of Dantean darkness in Dorking. The intimately small, igloo-shaped, benched room must have had some sense of mystery about it in its own time, lit only by candles, approached down the picturesque but not entirely safe stairs.

It is likely that here – for as long as his money held out – the gentleman creator would treat his friends to an excursion below, at which refreshments would be served. Fragments of porcelain tend to back this up. It's difficult not to hope that something stronger than tea was served and that, before the owner was ejected to the harsh world above and exiled to the workhouse opposite, he at least had a few decent parties down there.

I think it's not impossible that this mysterious final, rounded chamber might have been intended to resemble in miniature the Barons' Cave beneath the ruins of nearby Reigate Castle, and tap into its legends of conspiracy and roistering. That neighbouring town's mysterious subterranean structure was known by then, and would have been eminently visitable by an interested local gentleman.

A River runs through it

In Dorking, even the river goes underground. The River Mole is still known for its active swallow holes, into which it once wholly disappeared outside the town before re-emerging on the way to Leatherhead. In 1594 Cartographer Jon Norden noted that "at Darcking … the river goeth underground".

Later maps show that it "Here runneth under", and that phrase serves multiple mapmakers throughout the 18th century. The Mole's later emergence as a complete river (excepting the unforgettable and hallucinatorily long hot summer of 1976, when it was possible to walk on the parched riverbed between the two towns) suggests an early nineteenth-century rise in the water table. The effect in the caves must have been dramatic. The water poured in.

By the entrance to the lowest chamber is the bottom of the well which would later flood it, showing the tidemark left by the spring's iron content

There is still a very evident tidemark that climbs up the chamber's benches and rings the well. It is from here that dramatic Victorian tales of a sleekly black river silently pulsing beneath the town emerge. There are at least two claimed sightings of a boat sunk in this alleged smuggler's torrent. When you realise that any observer was standing five steps up, able only to see the well, awash, and the arch to the flooded chamber, you can understand the mythic misunderstandings of hidden waterways coursing just beyond the candle's flame.

In 1889 a journalist asks if he can paddle just as far as the arch to see what lies beyond. And is told (wrongly) that he would sink to his neck in the freezing water: "If we could launch out just a few yards we could see what is beyond that bend and we should probably find more caves. You see (pointing to bits of mildewed board) the remnants of a punt that floated here". And so the legend of the lost boat lives on.

The best explanation is that it was an old gate, door or a roof cover for the well that was tipped down the shaft when it fell out of use. The water was still there as late as the 1920s when the *Dorking Advertiser* reported a visiting councillor falling into it, and a 1924 photo of the beautifully orderly and swept wine cellars (where did they hide the cascades of loose sand and the hundreds of broken bottles that are there today?) in the *Wine and Spirit Trade Record* appears to show clear water still lapping at the floor. It speaks of "a wonderful crystalline spring", unconsciously echoing the wording of several Victorian accounts, including Charles Rose's recollections of the 1820s and 30s: "The crystal spring in the cave opposite was there then, and had been, in all probability, long before."

How long before is the problem. The fact is that of the five Ws we can only be sure of the where and the what, and guess at the who, when and why.

The Mole Men

The story of the cave's origins may well be true. Any seventeenth-century occupant of Butter Hill House would have been sandwiched between two great subterraneanists: John Evelyn, who installed two grottoes at Wotton House, plus a vineyard, canal, 160-yard tunnel and underground imitation Roman bathhouse at Albury Park House. And Charles Howard at Deepdene. Two of the richest men in England. Deepdene and Wotton House were stately homes; Butter Hill House was not. If its owner tried to match their excesses he did so with shallower pockets despite his deeper excavations.

When he did it, and who he was, is problematical. The carved date of 1666 might be too good to be true – how many quarries and mines in the Home Counties aren't claimed to have supplied the materials to rebuild London after the Great Fire? (Cliff Weight, who studied the caves with great objectivity, thought the first 6 might have been an eroded 8. It also lacks the ingrained sooty patina of the antique graffiti in the higher levels.) It, and a difficult to locate and confirm date of 1665 said to be at the top of one of the wellshafts, aren't mentioned until 1960.

The *Wine and Spirit Trade Record* article, like others before and after it, lists the earliest carved date as 1753. There is a definite 1672 in the main well, but it is unreachable to anyone not working in the shaft. It seems likely that it was incised by someone digging the well. Which could suggest a later date for the actual creation of the caves. Timbs, writing in 1822, says they were dug about a hundred years before, which would fit with the similar declaration of the 1855 *Hand-Book of Dorking*: "Over a century ago". Among the hundreds or more of shattered bottles I can find none earlier than the 1750s.

In the 1720s to 1730s Butter Hill House underwent major reconstruction, acquiring a whole new exterior. If this large and costly overhaul coincided with the overly ambitious digging, possibly undertaken by professional tunnellers, it might have proved financially ruinous.

In the end, does it matter? The caves are equally fascinating whether they were begun in the 17th or the 18th century. A precise date may be determined one day; it might only take the finding of a diary, deed, a bill from a mining company, or a declaration of bankruptcy.

Jubilee Vintage

Thankfully more recent history is well recorded. We know the names, addresses and specialities of the family companies that owned and then rented the tunnels in the Georgian and Victorian eras and beyond: Cheesman's, Young's (who sold them to Dorking Urban Council) and HG Kingham's (who rented them from 1912, explaining the repetition of that date in the vintage ports gallery).

All left their initials behind and the last was a prolific advertiser, leaving us the proof of what the caves once held. Interested in Very Fine Old Port Wines from 24/- a dozen? The 1887 Jubilee Vintage is just 3/4d a bottle. Or German wine? Very popular with the gentry; Leopold Salomons purchased prodigious quantities of it during his tenure of nearby Norbury Park House. Or perhaps Champagne takes your fancy. The 1904? Yours at just 48/- for twelve bottles. You can even order by telephone. Ask the operator to connect you with Number 9 Dorking.

In 1970 Dorking and Leith Hill Preservation Society took over the lease of the by then unused caves. They began escorted tours, which were made possible by Dorking Council and, more recently, Mole Valley District Council, installing handrails, concrete steps and emergency lighting. After some interruptions and an interregnum of several years caused by the closure of the local tourist information point, Dorking Museum now has the licence (and volunteer taskforce of cave guides) once again to offer access. The insurance, health and safety and licensing provisions have clearly been formidable.

The resumption of tours in 2015 is one small victory over the continuing loss of subterranean historical heritage. It's also a modest triumph for the town itself, bringing in visitors and opening up a hidden part of its history to its inhabitants. People who came on tours as youngsters in the 1970s and 80s are now bringing their own children. It's a rare party that doesn't have someone who mentions a cave they heard of or played in as a child or hung out in as a teenager. But so far never the same place. For one it's chalk caves, for another the Deepdene shelter, for someone else a forgotten sand cellar. It all underlines just how extensive the hidden honeycomb beneath Dorking actually is.

The Gardens of Eden

And none of it is more extensive than what is below Deepdene. Deepdene was a phenomenon, and so was its owner, Charles Howard. This was a house that never stopped growing, set in sublime hillside gardens; he was a man of huge wealth, with an imagination to match. Howard was a generous host who took pride in his creations. The result is that we have good descriptions of the house's first, of two, eras of subterranean glory.

In 1655, John Evelyn records that: "I went to Darking, to see Mr. Cha. Howard's amphitheatre, garden, or solitarie recess, being 15 acres environ'd by a hill. He shows us divers rare plants, caves, and an elaboratory." The laboratory was tunnelled into the hillside in which the new house so elegantly nestled. It appears to have been largely unplanned, with further, not always fully stable digging being ordered on a whim to make room for a new alchemical furnace or foundry. These required the excavation of various airholes and flues whose arbitrary siting was reportedly still puzzling visitors centuries later. Walking the grounds today you'll still find unexplained depressions and fragments of decorative columns and urns.

Dorking resident Daniel Defoe was another visitor, writing that: "The antient possessor, Mr. Howard, by

what we call a perforation, caused a vault or cave to be made quite through the hill."

If that sounds fanciful, then John Aubrey – who considered the estate "an epitome of paradise, and the garden of Eden seems well imitated here" – bears it out. "In the hill of the left hand (being sandy ground)," he wrote, "is a cave digged thirty-six paces long, four broad and five yards high; and at about two thirds of the hill, he hath dug another subterranean Walk or Passage to be pierc'd thro' the Hill; thro' which (as thro' a Tube) you have the Vista over all the South part of Surrey and Sussex to the Sea. The South Side of this Hill is converted into a Vineyard."

The use of tenses is significant. Aubrey is writing about a begun but not yet finished project to create an optical tunnel, driven simultaneously from both sides of the hill, that would allow Howard to see the sea (it wouldn't have). Later accounts say that "for want of an arch or support" the whole thing collapsed, burying the labourers' tools and only sparing their lives because they were at breakfast. The front entrance was converted into a shallow grotto.

Brought back to the surface: Deepdene's sunken mausoleum is once more visible and visitable

That setback didn't stop Howard, or later owners. After his death, aged 83, the estate passed to his brother, the equally rich Duke of Norfolk, of Arundel Castle fame. By 1822 the property, with a fine new Palladian mansion replacing the original house, was owned by the mind-bogglingly rich Hope family – the owners of the supposedly accursed Hope Diamond now in the Smithsonian Museum in Washington DC. According to Timbs, writing that year, the gardens are "a kind of FAIRY REGION … with several ruined grottoes and hermitages … ornamental bridges, porticoes, lodges, green-houses, orangeries, pineries". Within a few years you could walk twelve miles and not step outside Hope land.

The additions didn't stop there. In 1815 Thomas Hope built a temple, dedicated to his brother as thanks for him spending the staggering sum of £30,000 on a neighbouring estate and stately home for Thomas to knock down. That same year he took his two-year-old son on one of his famed art collecting expeditions. In

Neither riches nor Polidori could bring him back to life: Deepdene's mausoleum, shrine to Thomas Hope's lost son

Pisa, the boy fell ill. Despite treatment by Lord Byron's physician, John Polidori, of *Frankenstein, The Vampyre* and Villa Deodati fame, he died and his ashes were buried back home, where a mausoleum was raised.

By the time Deepdene (now boosted by the purchase of two major neighbouring estates and the demolition of their houses) finally left the Hope family's hands, it had become a confection of a house. A vast wedding cake of a structure with every wing, façade and chimney ornamented: a quiet riot of balustrades, columns, quoins, cornices, entablature and friezes.

In 1920 *The Times* noted that: "The future of such houses is for hotels and institutions. Deepdene is a place of great beauty." The extraordinary grounds, formerly studded with antique statuary, had shrunk, but the building was as stunning as ever when, in 1923, it passed into use as a luxury hotel, with a telegraphic address that pleasingly echoed Aubrey's description of it: "Eden, Dorking."

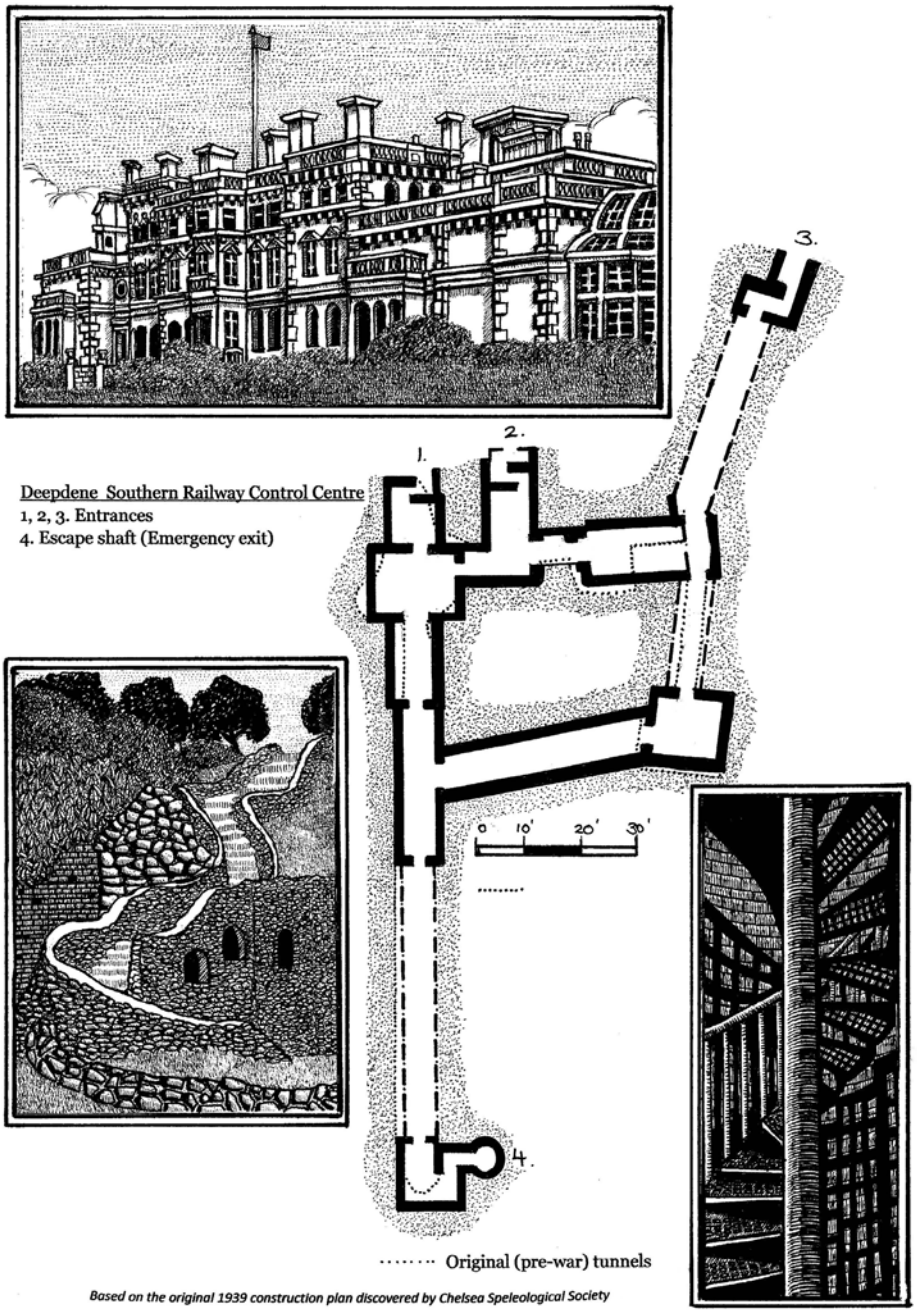
Rendezvous of Smart Society

Luxurious it was: offering 90 bedrooms, 26 bathrooms, courtly reception rooms, a ballroom, 50 acres of genuinely superb gardens, tennis, golf, dancing and "Recherché dinners at 7/6 to 12/6." As its advert stated, it was "Now open as a first-class hotel, and is the rendezvous of smart society." And at first all went well.

The hotel had everything necessary to succeed except good management. Its ownership was obscure, nominally in the hands of a Russian émigré, David Leonteivich Zhivotovsky, who had escaped the Bolsheviks and was at the centre of a dangerous mix of White Russians and ultra-nationalist exile groups subsidised by British Intelligence.

But behind the scenes was J. Maundy Gregory, clergyman's son turned atheist turned Catholic convert, actor, theatrical producer, magazine publisher, nightclub owner, "monocled dandy", informant to the intelligence services, and Lloyd George's middleman in the honours-peddling scandal. He had made, and continued to make, a fortune selling peerages on behalf of the Prime Minister (although he also dabbled in offering papal honours – for younger readers, that's papal, not Paypal).

The house had once counted Disraeli and Winston Churchill as frequent visitors. Now it acquired a reputation as a destination where guests' marital status was less rigorously examined than at other establishments. And things didn't get better. Under the management of Zhivotovsky's self-styled "Princess" of a daughter it was prosecuted for non-payment of its staff. Her disastrous eventual replacement was a boyishly young Italian waiter for whom the sybaritic Gregory had formed an attraction.



With the profits slipping, or more likely being squandered or embezzled away by this novelistic collection of exiles, fakers and spies, it all began to fall apart.

In 1934 Deepdene's once sylvan and peaceful grounds were scarred by a bypass built yards from the house. But the rot had set in years before. There were rumours of illicit liaisons, blackmail, prostitution and Dennis Wheatley-esque meddling with the black arts. A huge and locally-loathed neon sign was installed without permission atop the elegant roof line.

It's difficult not to allow your imagination now to toy a little with the questions raised by the hotel postcard, with its image of masses of automobiles proudly drawn up around the structure. Isn't it a bit too aimed at the kind of young men that mothers with marriageable daughters classed as NTBTIC – Not to Be Trusted in Cars? Shouldn't couples coming for a few days of golf or walking the Surrey hills be arriving in a taxi from the station, rather than in scores of shooting brakes with their concealing roofs raised?

Its finances doomed, its staff unpaid, and its reputation mortally wounded by its association with Gregory (who escaped a murder charge by having his probable victim shallowly buried yards from the River Thames so that by the time she was exhumed it was impossible to detect the poison that may have killed her), the almost empty hotel was dying.

Even if new owners could be found, as a hotel Deepdene had no future. But as an emergency command centre relocated away from the likely bombing target of the metropolis, it did. In 1938, with war approaching, the house and grounds were taken over by the Southern Railway. It was a superb match of need and available resources. The building offered space, room for a 99ft high radio mast, and proximity to road and railway links. Plus an array of subterranean real estate. Deepdene's second generation of underground glory was beginning.

Underground Railway (Control)

Very little new excavation was necessary, apart from the sinking of an emergency exit shaft protected at the surface by a shed-sized blockhouse with a pitched, bomb-deflecting roof. Construction mainly involved lining, strengthening (including the three entrances clustered around the 1770s Embattled Tower folly) and ventilation – plus the provision of a surface boiler room, toilet facilities and a huge concrete "bomb burster" slab above the tunnels.

All, judging by contemporary photos, was finished to a high standard: the well-lit and business-like rooms barely look like the interior of a bunker. Yet into them were fitted a telephone exchange, air plant, conference room, offices and accommodation, capable of twenty-four hour a day operation to plot damage, divert rolling stock, organise repairs and do everything necessary to maintain essential rail services throughout the worst of the Blitz and beyond. It is not wholly surprising that you hear of it as a happy place to work in those years.

The Embattled Tower folly is flanked by three sealed entrances to Howard's tunnels and the WWII bunker

Outside, the site became part of the Dorking anti-tank island, which saw the town expected to hold out against a mechanised German invasion force for one week, aided by an anti-armour ditch and hundreds of concrete dragon's teeth tank traps sited on the dene's banks. The *Railway Gazette* described bunker operations in a well-illustrated factual article in 1945. As Andrew Emmerson and Tony Beard note in *London's Secret Tubes*: "The caves (described in the article) were in fact a magnificent 18th-century shell-encrusted grotto of a calibre rivalling the more famous examples at Stourhead, Goodwood and Goldney."

If the underground facilities were excellent, and still in partial use in the early 1960s, what was happening above was not. The treatment of the mansion by the Southern Railway and then British Rail was condemned by Nikolaus Pevsner and other architectural historians as a disgrace; closer to vandalism than negligence. Gregory and his gang had at least preserved the house. By the time the railway moved on, Deepdene was rotting, and this irreplaceable architectural and historic gem was demolished in 1969.

Two of the three entrances to the WWII bunker

Found and Lost

In the by now much reduced gardens, parts of which had been saved for public use, things were little better. The Council, which had conserved the temple, worried that vandalism might endanger visitors to it. So they knocked it down. Similar concerns led to the mausoleum, which held (and still does) the remains of nine Hopes, being buried beneath concrete and earth in 1960. The following decade a modern office block, sensitively designed to nestle unobtrusively in the dene, was built on the site of the house.

Below ground everything was quieter. There was little decay. The rifle rack and telephone switchboard remained where they were. In the darkness, untouched, rarely visited. A Chelsea Spelaeological Society report from 1978 recorded that the ice house, main shelter and World War II-adapted East Cave, which had been used as a rifle range and still had an escape shaft in its domed roof, were still extant. "An approach to the caretakers," it noted, "can be productive."

The peace was broken in 1997 when a new generation of naughty boys started a fire while exploring the almost forgotten bunker. The fire service entered and quite quickly exited, dumping their outer clothes after realising that asbestos was circulating. A specialist inspection confirmed the risk and the site was closed off. Subterranea Britannica later surveyed it, with permission, and sealed the opening.

Unless a benefactor can be found to pay for the removal of the asbestos, allowing them to be opened up for tours in the same way as the South Street Caves, the tunnels are, sadly, likely to remain closed to the general public forever.

Lost and Found

But you never know. Nothing is impossible. Against all the odds what remains of the gardens of "Eden, Dorking" have undergone an extraordinary renaissance. A joint coalition of community group The Friends of Deepdene; the Mausolea and Monuments Trust; Mole Valley District Council; Surrey Wildlife Trust; and the travel firm Kuoni, which has occupied the new offices since the 1970s, has opened up some of the grounds to the public. They were triumphantly unveiled for the Heritage Days 2016.

The heart of the gardens, a mix of publicly owned and leased land, now welcomes visitors, with regular tours on offer that include entry to the recently-exhumed mausoleum. The entrance to Charles Howard's collapsed hill-piercing tunnel is still there too. Converted into a small grotto, it later acquired ancient statuary and then a wartime front wall to make it suitable as a guard post or office (probably not an ammunition store, as it had windows). It has now been artfully restored, sadly without the huge statue of an Egyptian god. One niche remains unfinished to reveal the 17th-century bricks and flints covering the soft sandstone rockfall behind them that doomed the tunnel attempt.

Deepdene grotto, all that remains of the attempt to bore through the hill as a prospect improver

Deepdene's surviving gardens have been brought back to life. But they're at risk. Central government legislation from 2013 has denied local authorities the input they previously had into changes of building use. The result has been to facilitate a quick profit by converting functioning office space into lucrative and speedily-sold flats. The office block at Deepdene, home since the 1970s to Kuoni, a significant local employer, is likely to be lost. The Council, workforce and residents, who know the town needs a mix of places to work in as well as to live in, appear to have no way to prevent this.

There's another smaller cloud on the horizon of the successful reclamation of this site. The contaminated wartime surface buildings have now been removed. All save one, probably the most interesting: the little hillside bombproof cover to the emergency exit.

In the pages of this magazine it's safe to say that this is now the favoured entrance for those so-called urban explorers who are prepared to force a way in. Those who find it sealed and walk away deserve recognition, but those who use pickaxes or power tools to break and enter – and regrettably several have and do; you only need to visit at intervals to see the willingness to smash doors and even historic walls – leave it open behind them. They are most likely aware of the asbestos danger; the children who stumble over their newly created entrances generally aren't.

Those in charge of the site are being forcibly presented with a dilemma: preserving lives or preserving a unique piece of wartime architecture (which is itself now under attack). Sadly the answer is likely to be to collapse the stairs and fill the shaft, or even demolish the blockhouse itself.

Under attack, the emergency exit building with an access hole smashed in it

Recently ruined by repeated incursions, the bunker's emergency stairs

The above paragraph was written after the unveiling of the gardens. Just three weeks later the bunker has been entered at least twice – those responsible left their filter masks and packaging strewn around so it's easy to know. They cut the hazard tape placed to warn people of danger and dumped it, even though it would have taken a minute to move and then replace it. One lot also decided to use a section of rail to widen the opening created by earlier entrants. Like them they ignored the effect of the rubble falling on the staircase, and that its handrail was cemented into the brickwork they have pulverised.

Hundreds of dragon's teeth stud the dene's slopes

The result is that the lower half of the stairs has now given way, just leaving the handrail spiraling sadly and faithfully down into the pile of masonry and fallen metalwork below. A piece of World War II history designed to survive the Blitz has fallen victim at least in part to people whose philosophy is said to be "take nothing but photos, leave nothing but footprints".

Despite this and the concerns over future access, Deepdene is still rather magical. The parts that have been unearthed are fascinating. Those that have been left wild are just a tiny bit unearthly. Go off the paths, push under and through the trees and you still find ruins and rubble, dips and depressions, and hundreds of mossed wartime dragon's teeth marching greenly over the heavily wooded hillside, whose dense canopy reaches down to claim them.

To be continued ....

In the next edition of Subterranea *Sam will conclude with an exploration of what lies beneath the hostelries of Dorking. Plus references and acknowledgements for the two articles.*

Photos by Sam Dawson

SURFACE WALK AT MERSTHAM, SURREY
Saturday 27 May 2017

Surface-only walk of two or three miles in and around Merstham, east Surrey, led by Paul Sowan, to see the locations of subterranean building-stone quarries, a quarry drainage adit, traces of a pioneering horse-drawn tramway operated 1805 to 1838, a tunnel surveying observatory, and two main line railway tunnels.

There are two or three steep muddy footpaths to climb. No hard hats or lamps are needed! But wear stout shoes and appropriate clothing for a country walk.

Historical details will be given at each site.

This is the second of an intended series of surface-only walks at underground sites around Croydon and east Surrey. The message is that to better understand an underground site it is essential to appreciate its geological, hydrological, geographical, historical, strategic and economic context.

You won't understand the underground if you don't understand and walk the surface.

Meet at Merstham Station at 14.00 (or earlier in *The Feathers*), Saturday 27 May, 2017. Merstham is on the A23 a couple of miles north of Redhill, and is served by trains from London and East Croydon, or by 405 bus from West Croydon.

The tunnel surveying observatory

The (Famous) Five Railway Tunnels of Marchwood, Hants

Darren Kitson

The fake tunnel portal built on the Marchwood Military Railway for filming the Enid Blyton novel 'Five Go Off to Camp'

Southampton and the surrounding area is not a location well known for railway tunnels and even less for the Totton–Fawley branch line. Nevertheless, two little-known tunnels existed on the Marchwood Military Railway briefly during the summer of 1977.

To use a description popular in the 21st century, they were 'faux' tunnels erected by Portman Productions for the Southern Television adaption of the Enid Blyton novel *'Five Go Off to Camp'*, one of the *Famous Five* series, and which was aired in 1978.

This is the story of the Marchwood tunnels but first a brief history of the military presence at Marchwood is appropriate.

The Royal Navy had been founded in 1660 as the 'Senior Service' (the British Army, in the national sense, was founded the following year). Of course at that time weapon propellant was gunpowder – a substance which only began to be phased out from 1889, when cordite was developed. Both substances are known as 'Low Explosives' as opposed to 'High Explosives', the difference being the former flares and the latter detonates.

The Royal Navy initially concentrated its gunpowder supplies at Portsmouth, but as Portsmouth grew the relationship became uneasy and it was eventually decided to disperse storage to, amongst other places, Marchwood.

Royal Naval Armaments Depot

What was then known as Royal Naval Armaments Depot (RNAD), Marchwood, came into use in the second decade of the nineteenth century. Sources give a range between 1812 and 1815 but 1812 is the most often quoted year. It was located north of the creek and just north of the present-day incinerator and power station and at the shore end of what became Magazine Lane.

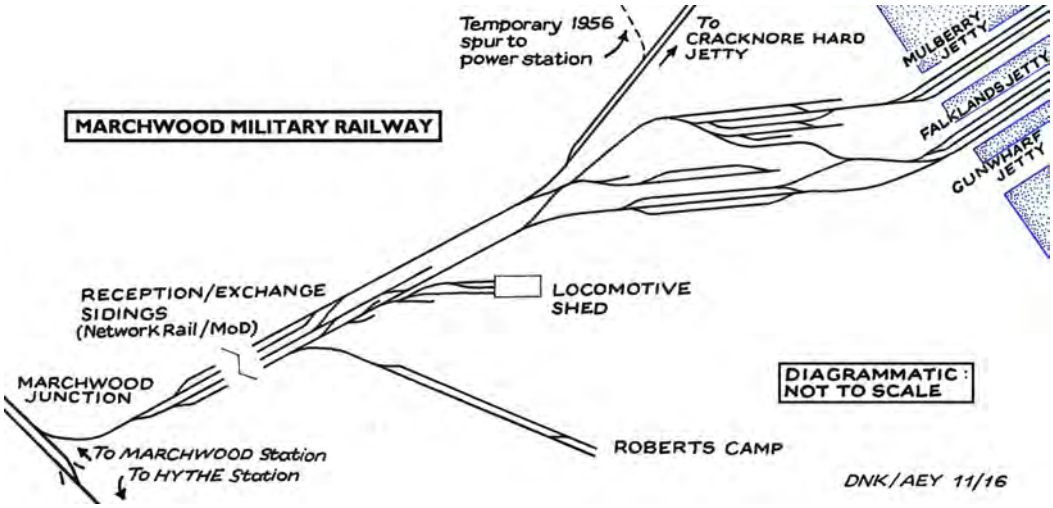
There were three magazines (A, B & C); a seawall fronting Southampton Water and continuing part away alongside the creek; receiving and examining rooms; an office, guardroom and barracks facing onto Magazine Lane. In addition there is believed to have been an internal canal system used for moving barrels around the site, plus barrow-ways and of course a jetty which extended out into Southampton Water's deep-water channel.

There was also a Commandant's House, located roughly in the centre of the site and with its entrance between the office and guardroom on Magazine Lane. At some stage the house came to be known as 'Ordnance House'. Today much of the site is better known as the home of Marchwood Yacht Club.

The first visible sign of activity at what would become Marchwood Military Port, known today as Marchwood Sea Mounting Centre and McMullen Barracks, occurred in 1939 when a railway spur 1¼ miles long was opened to Cracknore Hard Jetty and came to be known as the Cracknore Hard Branch.

For those not familiar with the area, Cracknore Hard is located north of the military port between it and Marchwood Power Station. Little is on record about the spur, other than that it served a magazine and was of course connected to the Fawley branch. It thus created what is today known as Marchwood Junction, i.e. the junction with what became in 1943 the military railway.

This view from August 1977, is a publicity shot and shows the lead cast of Five Go Off to Camp posing in front of in-steam Austerity Army No.92. From left to right and with character names in brackets are Gary Russell (Dick); Jennifer Thanisch (Anne); Michele Galagher (George); Marcus Harris (Julian). In the foreground is Toddy (Timmy [The Dog])



The map shows the track layout of the Marchwood Military Railway as it is believed to have been in the early 21st century

The magazine (there were actually four within a single compound and all are now demolished) was located on the immediate south side of Cracknore Hard and to the north of the creek which marks the geographical northern boundary of the present port area.

Military Port

The military port, as we will refer to it, was a product of World War II and specifically used for the construction and dispatch of Mulberry Harbour components – but not the gigantic ferro-concrete 'Phoenix' caissons.

Following the end of hostilities the military port was one of several to see the return of troops and equipment. During the 1948–1952 period there appears to have been something of a lull while its peacetime role was decided upon and what activity did occur seems to have been connected with British troops stationed abroad and in Germany in particular.

Germany, of course, was not the only foreign location which possessed British garrisons and from the early 1950s the military port became the main port of supply for anything from toilet rolls to tanks; it ultimately became the base of the semi-civilian Royal Fleet Auxiliary.

The Cold War saw the Royal Navy, in its role within NATO, become very much submarine-orientated; the folly of this was learned during the Falklands Conflict of 1982. Subsequent years saw the military port expanded, not least by the construction of a third jetty, known today as Falklands Jetty.

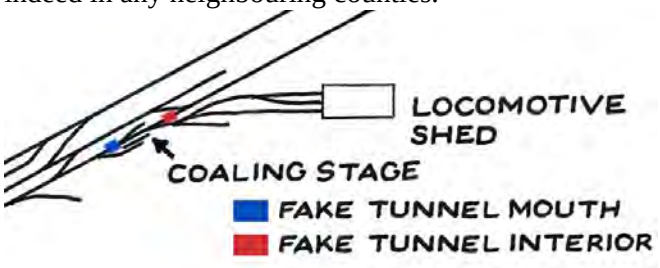
Crucial, then and now, to the operation of the military port is the Marchwood Military Railway which from September 2016 became the only source of regular traffic on the Fawley branch. Back in 1977, Portman Productions was looking for suitable filming locations for *Five Go Off to Camp*.

The storyline was of the Famous Five investigating a 'ghost train' supposedly seen during the night on a disused railway crossing a remote moor before mysteriously disappearing. The Five stumbled across a disused railway tunnel which, it transpired, was used to conceal the train and also served as a store for smuggled goods. Quite how smoke and steam drifting from the tunnel and the polished rails of a supposedly disused railway would not give the smugglers away was not explained – although as far as can be ascertained ghost trains do not leave polished rails behind them.

Location, Location, Location

The entire episode was filmed within Hampshire, mainly in the New Forest area. Presumably this was done as a nod to the local economy within the Southern Television area and perhaps also for budget reasons.

The original novel dated back to 1948 and thus involved a steam locomotive, so Portman Productions was faced with finding a disused tunnel, with track in situ, which would be suitable (i.e. had easy access for crew, equipment and road vehicles) and available for filming. At the time, no such tunnels existed in Hampshire or indeed in any neighbouring counties.



The locations of the fake tunnel mouth and the smugglers' base within the tunnel are indicated

A further consideration was the filming of the smugglers' base within the tunnel. As this would have been difficult, if not impossible, within a real tunnel due to space restrictions, the answer was to use a separate building for these interior scenes. Finding a steam locomotive in working order was not a problem but finding one which happened to have access to a disused tunnel and a suitable building to pass off as the smugglers' base supposedly within the tunnel was.

The answer to all bar one of the aforementioned problems was found on the Marchwood Military Railway. The remaining outstanding problem was the tunnel, and the solution was to create a fake tunnel. It must be said, film production companies in the days before computerised techniques were generally very good at creating such illusions and their craftsmen were highly resourceful.

So in the proximity of Marchwood Military Railway's locomotive shed – a fairly new structure which had replaced the original wartime Nissen Hut – was erected a false tunnel mouth. About 100 yards beyond this and also close to the locomotive shed was erected a second structure used to represent the view inside the tunnel from its exterior.

This is taken from a scaffold tower erected for filming purposes and what we are seeing is a framed sheet of glass with a not-too-convincing moorland scene painted onto part of it and used to block out the unwanted background. The camera would be carefully positioned to line-up the scenery with the fake tunnel portal

Tunnel Vision

The tunnel portal was quite realistic and complete with imitation stonework but its arch was to a peculiar design with a horizontal section where a keystone would normally be located. Painted-on smoke stains, however, disguised this oddity to a degree. The tunnel mouth was a mere few feet deep and blanked off at its rear, the depth being just enough to give the impression of the track disappearing into the darkness – this effect worked very well.

The tunnel mouth was erected adjacent to and partly on the locomotive coaling stage, part of which remained visible. Foliage was planted around the tunnel mouth and scenes were shot through a sheet of glass painted with a moorland scene, the purpose of this being to blot out any unwanted background as well as providing the moorland setting. The painted glass had what one might call an aperture, this being aligned with the faux tunnel mouth.

A photograph of the painted glass shows the moorland scene to be almost cartoon-like, but when it appeared in the film it looked very realistic indeed. Scenes were shot from a scaffold tower upon which was mounted the painted glass, itself mounted in a wooden frame.

Obviously these structures could not accommodate a locomotive or the accoutrements of the smuggling trade and, yet as we have seen, the smugglers' base was inside

the tunnel. This problem was solved by using the interior of the locomotive shed to represent the smugglers' base but despite the relevant scenes supposedly taking place during twilight hours certain details of the shed could be seen in the film and thus these scenes were rather less convincing.

Rolling Stock

A number of scenes were shot elsewhere on the military railway and notwithstanding closing credits mentioning Marchwood and "the help of the Royal Engineers", these scenes, shot in daylight, very obviously showed a military railway with very distinctive concrete sleepers, an ex-BR suburban coach in military livery and a number of wagons. The train used comprised Austerity saddle-tank Army No.92 WAGGONER (HE3792/53) and a couple of ex-BR Conflat (Container Flat) wagons, and was positioned on the length of track between the two faux tunnel structures.

Army No.92 WAGGONER was required to be dirtied-up for the filming of 'Five Go Off to Camp'. She is seen here looking towards the locomotive shed. In front of the shed is the mock-up used to represent the interior of the tunnel and the robbers' store

No.92 was the last military steam locomotive at Marchwood and had been retained primarily for special events but was also occasionally used on the, then, internal passenger service. The production company required her smart green livery to be 'dirtied-up' to simulate a locomotive supposedly spending much time hidden away in a tunnel.

Notwithstanding railway staff being assured that the 'dirtying-up' would simply wash off, the result was damage to No.92's paintwork. The production company therefore paid for a complete repaint, from which No.92 emerged in a lined blue, red and black livery which, incidentally, differed from the familiar Longmoor Military Railway livery.

A former member of staff at Marchwood who was present when filming took place advises that No.92 was in steam during filming. However, from watching the film, aired on 14 August 1978, this detail is not entirely clear but she was certainly in steam for a publicity shot in which she posed behind the Famous Five.

Marchwood Military Railway staff were assured the dirtying-up effect would simply wash off No 92. When it was removed it was found to have badly stained the green paintwork, the result being the production company paying for a complete repaint and the lined blue/red/black livery seen here in May 1978

Later Productions

Enid Blyton's *Famous Five* series ran to a long list of novels based on the adventures of the 'Five' (four humans and a dog), and it is worth mentioning a couple of further productions in order to allay any confusion. Marchwood railway station also appeared as the fictitious Kirrin station in the 1996 filming of *Five Are Together Again*, aired by HTV (Harlech Television) on 2 February 1997.

In 1995 Portman Productions again produced *Five Go Off to Camp*, now for Tyne Tees Television and aired on 29 July 1996. This time the setting was the Tanfield Railway, with filming locations being Marley Hill shed and Andrews House station at which latter location the overbridge did duty as the tunnel.

The locomotive, which was certainly in steam, was ex-Ashington Colliery Austerity saddle-tank No.38 (RSH7763/54). This telefilm showed rather more general railway scenes when compared to the Marchwood version, including a very blatant shot of a pair of NCB hopper wagons among other things and, as at Marchwood, such scenes made the supposed setting of a disused railway rather incredulous.

After all, smugglers' trains and ghost trains aside, a disused railway would not normally have any railway vehicles present. Nevertheless, as a big plus for the Tanfield Railway, the 'tunnel' and smugglers' train scenes were much more convincing than the equivalent scenes at Marchwood but in fairness the latter were by no means anything less than very good.

Sources

All information is drawn from the Marchwood Military Railway and The Military at Marchwood features on the Disused Stations website, by the same author.

Photos (except the publicity photograph) by Andy Crespin, driver of No 92.

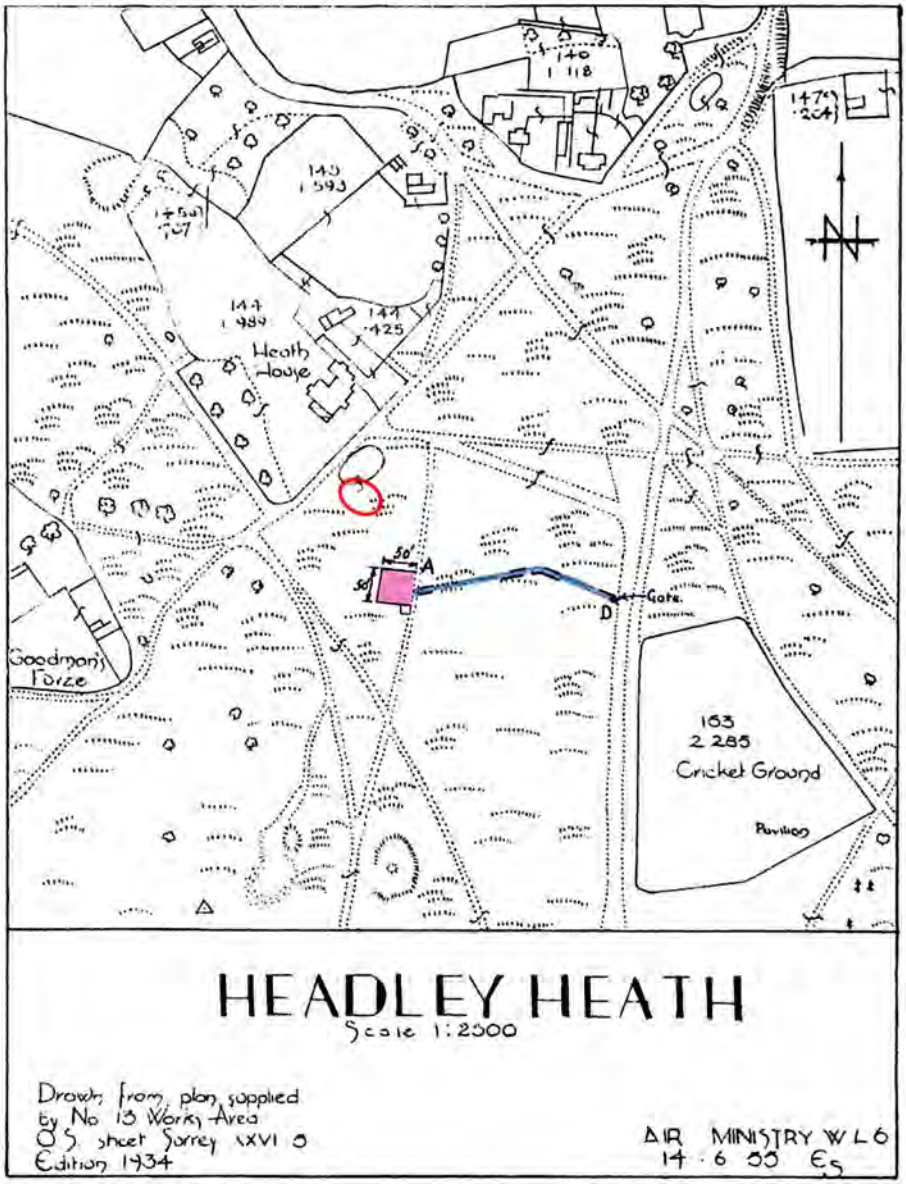
Headley Heath ROC Post Site Investigation, Surrey

Ed Combes

Occasionally Mark Russell and I are contacted via our Cuckfield ROC Post webpage with people asking for help with ROC queries, or locations of ROC posts. Usually we can answer these quite quickly and easily but a recent request we had from the National Trust (NT) took somewhat longer to resolve.

Headley Heath is a large NT site between Reigate and Leatherhead in Surrey and comprises open heathland, woodland and chalk downland. The Trust was looking to excavate the ROC post on the site which was demolished, as far as records tell us, in the early 1970s. The listing on the Sub Brit website states that the monitoring room wasn't infilled so we thought that there may be a chance that we could find it, and the National Trust might subsequently excavate it.

The investigation team



Air Ministry map of 1955 showing the proposed position for the new underground ROC post at Headley

The Trust had taken the Sub Brit grid reference and that from *Attack Warning Red* and had worked out roughly where the post 'should' be. It was at this point they contacted Mark and myself as they were keen to have someone on site that could identify any finds/artefacts they unearthed. A date was arranged – unfortunately Mark couldn't make it – and on a cold March morning I found myself at Headley Heath with the National Trust Rangers and volunteers, and a digger driver and machine.

Test Pits

An area had been plotted out using ground-penetrating radar (GPR) and a series of test pits were dug using the machine. Unfortunately, we did not find anything apart from alluvial gravel deposits and non-ROC hardcore from a previous car park project on the Heath.

So we filled the holes in, and I gave a short talk to the NT volunteers on the history of the Corps and showed them examples of equipment that would have been used at the Headley post. We then adjourned for the day, as our special dig permission (Headley Heath is an SSSI) had expired and we needed to come up with 'plan B' for locating the post.

A few months later Mark and I received another email from the NT ranger, Cliff; one of the volunteers had found a map relating to the construction of the post and paperwork relating to its demolition. This gave us a more accurate location to search in and we

made a plan to meet again in November, after the ground-nesting birds had departed. This time however Mark and I spoke with Sub Brit member Adrian Armishaw, whom we had both worked with on other projects.

Adrian we knew had access to some fantastic high-end metal-detecting equipment. He also had experience of locating buried/demolished ROC posts using the same equipment. Armed with an overlay of the map against modern-day Google Earth, two accurate GPS units and the metal detector (Whites TM808 if you are interested!), we set off for the heath. Heath volunteers had cleared the target areas of gorse and we met up with the Ranger to start our search.

Adrian Armishaw using a metal detector to try and locate the post

We started with a 'field walk' and identified some landmarks that predated the ROC post that featured on both the old map and the modern-day map. These included a nearby house, a large oak tree planted for the Coronation, a dew pond, a junction in the bridleway and the road. This gave us a number of possible locations of varying likelihood to search and Adrian set off with his detector, scanning in a grid pattern.

Land Mine

First we scanned new areas, then probed 'possible-but-unlikely' areas then finally we rescanned the areas we had dug the previous winter. Unfortunately, we didn't find the post despite a careful search in the area that it was indicated to be on the old map. However, we did find a BBQ, a rubbish dump, a large cast-iron pipe and a WWII practice land mine.

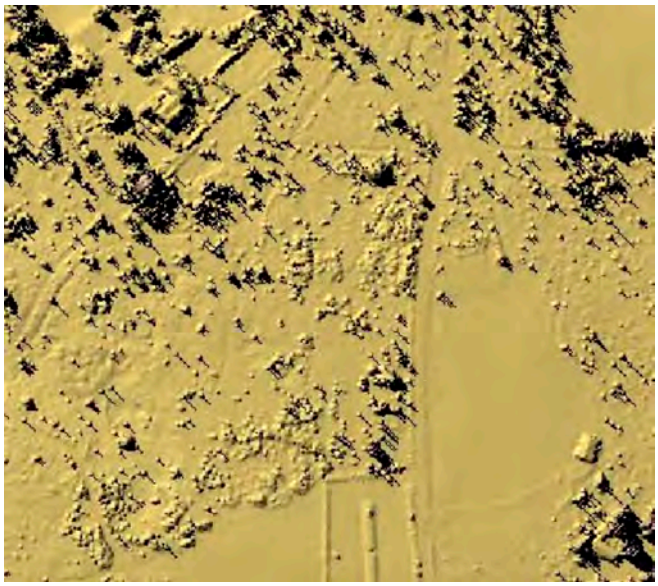
The last item had presumably been left by the Canadian Army in WWII when they used the heath as a training ground. The NT had found a couple of these over the years and were able to identify it for us. They kindly allowed Adrian to take it away for further study and public display at the small museum he helps run at Sywell Aerodrome in Northamptonshire.

Peter (NT volunteer), Cliff (NT Ranger), Mark, Adrian and I formulated a number of possible hypotheses for our not finding the post:

The practice land mine

1. The old Air Ministry map is dated 1955 and only indicates a *proposed* site; the post was eventually opened in 1966, and could possibly have been built elsewhere.
2. We had missed it by a couple of feet and it is just outside the locations searched – unlikely as we searched quite thoroughly with a variety of methods (GPR, metal detecting, machine digs, road spikes, field walking).
3. The post had been comprehensively demolished by the MoD and the site returned to nature, as the original NT paperwork indicated and stipulated.

Having run out of ideas ourselves, we decided posting on the SubBrit members forum our findings so far to enable wider discussion. Several people posted some very good ideas, and photos and directions to search and after studying some LiDAR images posted (a fascinating imaging technique using lasers that can reveal features on the landscape not seen by the naked eye) and examining old OS maps, fellow SubBritters Bob and Clive suggested field walking the opposite side of the Heath, behind the cricket pavilion – an area as yet unsearched by Mark and I but according to the National Trust held nothing of interest.



The LiDAR image

The 1955 map overlaying a recent aerial view. White dots and lines – triangulation/land marks used. Red circle – area indicated by ground-penetrating radar; this was machine-dug. Blue areas – approximate areas searched with metal detectors, field walking and ground spikes

It had become apparent that there were 3 different Observers posts in 3 different locations at Headley – the wartime surface post in one place, the 1950's Aircraft post in another and finally the underground post. No evidence of the surface posts survives at all, but Bob and Clive did find a disused septic tank of 'about' the right size behind the cricket pavilion. Could the post have been converted after closure in 1968?

This has been done to others posts so is a possibility but I personally remain unconvinced (at the moment) about the septic tank for a number of reasons; internally it is different with no evidence of the 'toilet' area of an ROC post, and no evidence of the fittings in the roof (could have been re-roofed though?) and the ventilation pipe is just that – a pipe as opposed to the square section vent of an ROC post. This structure needs to be investigated more with some internal measurements taken to compare – Clive, Bob and I hope to do this soon to either prove or rule it out!

Conclusion and Future plans

So, we have not yet found the underground post despite quite in-depth searching but I think it is fair to say we have found where it isn't! Further activities proposed for the future mainly revolve around deeper searches of the NT archives for more information, plus searching for period photos or aerial photos of the heath from 1966-68 that may help tie down a location more accurately and properly surveying the septic tank.

If anyone has any ideas or information please let me know!

All in all this has been an interesting exercise and has been (although frustrating) nice to undertake, especially with the lively conversation on the SubBrit forum and other members (Bob, Clive and Ben) willing to 'pitch in' and search as well. Who knows, we may find it yet!

Inside the septic tank which appears somewhat narrower than an ROC post. Photo Clive Penfold

Photos by Ed Combes unless stated

The Lagan Weir Tunnel, Northern Ireland

Chris Rayner

Under the middle of the river – downstream is the left. Service cables and hydraulics are neatly set behind weldmesh screen on the right

If you Google the words 'Belfast' and 'tunnel' you'll eventually find reference to a tunnel at Lagan Weir. Finding out more about said tunnel is less easy, for while there is a lot of information on the web about the new award-winning footbridge at Lagan Weir, and much less on the weir itself, there is virtually nothing about its tunnel. This was intriguing and something that needed to be looked into, and the Sub Brit visits weekend in Belfast in October 2016 seemed to be the perfect occasion.

River of Mud

One associates the word 'weir' with sub-surface river dams used to catch fish or rubbish; perhaps not the world's most interesting constructions in other words. The Lagan Weir, however, is something more akin to the Thames Barrier, as it is raised and lowered in relation to tidal flows. In this case, however, it is not to prevent flooding but in order to keep river levels upstream more constant.

Belfast grew up from an old settlement at Beal Feirste, an old Irish name meaning 'the mouth of the Farset', the Farset being a tributary of the river Lagan. It was the site of a Norman stronghold and became a town in the early 17th century. Sited by one of Ireland's most sheltered harbours and linked by the River Lagan to a rich agricultural hinterland, the town was destined for greatness.

The view from the footbridge – the weir gates lifted and Pier House no.4 is nearest. The lattice girder between Pier Houses is a safety feature - when the weir is impounding water and cannot be crossed, the lattice girder is lowered via an electric winch system. The girders were an add-on to the weir's original design but haven't worked well and may be removed in the future

The river Lagan had thus for centuries been the driving force behind Belfast's origin and growth, and a great deal of industrial development would take place along it. In common with other urban rivers however, it had become the local sewer and waste disposal channel. Fish were non-existent and wildlife had wisely retreated to less

toxic areas. At the same time, three-metre-high daily tide variations meant that for large parts of the day residents and visitors alike were faced with unsightly intertidal mudflats, strewn with rubbish and foul smelling.

Lagan Weir was the answer to this, completed in 1994 and comprising a series of large steel barriers that would be raised as the tide ebbed to keep the water level upriver constant. Coupled with this there would be upstream dredging on a large scale and an underwater aeration system to improve water quality. The movable barriers also allowed passage of craft up and downstream at the right level of tide, acting effectively as a single-gated tidal lock.

Inside the 'Lagan Lookout' Peter Gallagher, the River Manager, explains the background to the Weir

Fish Bellies

The plan was impressive. There would be five bottom-hinged steel gates or Fish Bellies, each 20m wide and 4.5m high. These would be built by renowned Belfast shipbuilders Harland and Wolff, and would be hung off four mid-river Pier Houses linked by a 150m long tunnel, called the Gallery, seven metres below the river surface.

Cross section of the Weir showing the huge hydraulic rams that lift the flap gates, the service Gallery tunnel crossing the river bed below, the sheet pile coffer dams used to hold back the water during construction of the Pier Houses, and the 30m long steel tube piles used to punch through the Belfast 'sleech' (a soft mixture of sand, gravel and boulder clay) to the firm sandstone bedrock below

Meanwhile, a control and lookout building at the west end would oversee the computer operation of the weir and monitor river conditions.

The latter, the West Quay, was our initial destination and where we would meet Peter Gallagher, the River Manager, who explained how the weir was built in the 1990s. For example, there are thirty thousand tonnes of concrete in the weir and twice that weight of stone fill.

Ten miles of steel piles were used in the construction of the pier houses and seventeen miles of electric cable to operate and monitor the weir's gates. The overall cost was £14 million, making it one of Northern Ireland's largest civil engineering projects at that time.

The weir has been an unqualified success story and the water quality has improved to such an extent that salmon are again spawning in the upper section of the river, using one of the weir's two fish passes to navigate the weir itself. The site has also become a minor visitor attraction itself.

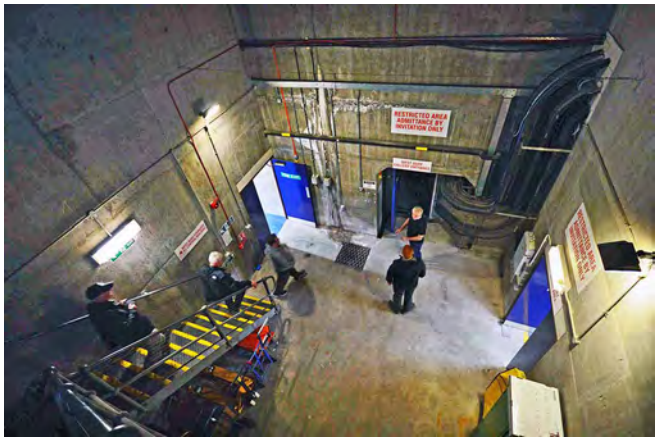
Under the River

After Peter's introduction, we visited the Control Room and then, passing several Restricted Area signs, descended several flights of steel stairs into the tunnel itself, and made our way along under the river. The long low-lit passage is broken by several pools of light from each of the four Pier House access chambers.

Hydraulic power pack inside the East Quay control room - this pumps oil in and out of the large hydraulic rams which raise and lower the gates. There is one hydraulic power pack per ram and one ram per gate. The hydraulic packs have back-up oil pumps which can be switched over in the event of mechanical failure

Each Pier House has a large subterranean chamber, with some beautifully finished concrete, and a much steeper access stair up to the surface Pier House. There are also some very minor leaks in the subterranean Pier Houses caused by supports for the new curved pedestrian footbridge. This award-winning footbridge replaced an earlier, more utilitarian, one, and being cantilevered, it needed additional emplacements of concrete to help anchor it.

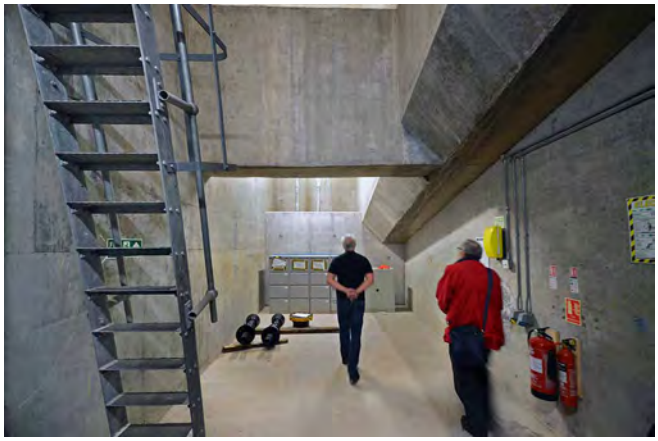
At the far end of the tunnel is the East Quay, where there are several tall underground chambers used for storage. A few leaks here have been caused by fixings through the concrete ceiling high up, which turn out to be for lampposts.



Coming down from the Control Room in the 'Lagan Lookout' to the West Quay gallery entrance

Stairs from here lead up to the East Quay circular surface building, which incorporates a smaller plant room. The whole structure is manned continuously and there are impressive back-ups that ensure the weir remains operational in the event of failure of any element.

Looking along the Gallery tunnel from the west end



Peter Gallagher, the River Manager, and SubBrit member Brian Hillman (?) looking up inside Pier House no.1. The hydraulic rams that lift the weir gates are hidden behind the massive concrete walls on either side of them. In the floor is a blanked off pipe that was put into the weir structure as a backup measure if water quality was poor - the idea was that a compressor could have been hooked up to the pipes to pump air and aerate the incoming tide. Thankfully it was never used

All too soon our visit was over and we said our farewells as we walked back across the bridge in bright sunshine. From here we could also see the rescue boat that is manned by staff who also provide a steward function on the impounded River Lagan.

Many thanks to Peter Gallagher, the River Manager, and his team for allowing our visit.

Photos by Chris Rayner

Subsurface lavatories at Kennington Lane, London

Paul Sowan

Subsurface public conveniences are, not very conveniently, being closed, sealed off, filled-in, and even in some cases adapted for other purposes than 'spending a penny'. David Perrett has reported on a previous 'gentleman's toilets' at 180 Kennington Lane now called 'The Arts Lav' which has been taken over by some local artists as a sort of micro arts space. Down the stairs behind the cast-iron railings you find a Victorian Gents, with original marble urinals by Finch & Co. of Lambeth and three heavily graffitied cubicles. There are two cisterns – one is modern but the other is a fish tank cistern probably original and dating to 1898. The vent pipe outside is also by Finch & Co.; it is topped with a fine golden crown.

So-called fish tank cisterns in public lavatories had glass sides, but were presumably not intended as homes for ornamental fish!

Your scribe's earliest memory of man-made or man-used underground space was of the former sub-surface gentleman's lavatories (there were none at the location for ladies!) outside the former *Swan & Sugar Loaf* public house at the Croydon end of Brighton Road, South Croydon, which he passed on the way to and from school from 1945 to 1951. Rather scary posters warned, printed in black on blue-green paper and overprinted with the large letters VD in red, that 'delay is dangerous'. Having no idea what was the significance of the large red letters, he concluded that 'hanging on' when you needed to 'spend a penny' was life-threatening! So every opportunity was taken to 'go' on the way to school and back, just in case!

SOURCE: PERRETT, David, 2014, It's those fish tank cisterns again! Newsletter Greater London Industrial Archaeology Society 274, page 6.

D-Day Visits around Southwick, near Portsmouth

Martin Dixon

Martin Dixon introduces the day in front of the massive wall map that details the situation at H-Hour on D-Day. The marshalling area beneath the Isle of Wight was known as 'Piccadilly Circus' and from here individual routes led to each landing beach.

Dozens of sites claim to have been used for the planning of D-Day in 1944 and the chances are, most of them probably were. The complexity of the operation must have demanded multiple teams working on different aspects of the invasion – weather forecasts, troop transport, mapping, ammunition and other supplies, the airborne assault, back-up, communications etc. However, it is known where the date of the invasion was finally agreed and from where *Operations Overlord* and *Neptune* (the seaborne element) were controlled.

Back in October, a Sub Brit member told me about an English Heritage visit he'd made recently to a couple of sites near Portsmouth associated with D-Day. One site was deep underground so it seemed ideal for a Sub Brit visit but as the other site is up for sale I thought we ought to move fast. So after a week of emails, phone calls and form-filling we'd agreed a programme of visits for 6 December 2016 – precisely 72 years and six months after D-Day itself.

A Full Day

The day was centred around two key sites – the historic Map Room at Southwick House and the excavated tunnels beneath nearby Fort Southwick. Two other sites were added in to make for a full day – the Royal Military Police Museum and the Royal Armouries museum at nearby Fort Nelson. Knowing that the trip would be popular we ascertained the absolute maximum we could accommodate and arrived at a total of seventy attendees.

So at 0945 on 6 December, we all assembled in the car park at Southwick House. Almost everyone was early or on time and it was good to see lots of new faces – many on their first Sub Brit event. Southwick House lies about eight miles north of Portsmouth Dockyard and was first requisitioned in 1941 to provide accommodation for the Royal Naval School of Navigation. Later on in WWII, it was seen as the ideal location from which to oversee the invasion of France and in April 1944 in great secrecy the D-Day team moved in.

Carriage-mounted gun pointing inland from Fort Nelson

Southwick House remains an active MoD site as part of Southwick Park – the Defence College of Policing and Guarding and the Regimental Headquarters of the Royal Military Police (RMP). As a result we'd had to submit names and nationalities in advance and photo ID had to be carried during the visit. As we entered the site a large blue-light convoy of civilian police left the site with motor bike outriders – the site is also used for vehicle training by other police forces.

The east elevation to Southwick House of 1843, showing the ionic columned porte-cochere. Beyond to the right is the stable block and service wing, now housing the RMP Regimental Museum

Map Room

We made our way into Southwick House – now the Officers' Mess – and were given a warm welcome by Richard Callaghan, curator of the RMP Museum. Richard escorted us into the superb map room which still has one wall covered by the huge original map used to plot the movement of vessels across the Channel in June 1944. We learnt that it had been made in secret in the Midlands by the toy company Chad Valley in their jigsaw department.

A giant map was commissioned and delivered, covering the whole of the occupied continent from Norway to the Pyrenees, but only one small section showing Normandy was actually installed. The men who installed this section clearly now could guess the location for the planned invasion and so were placed under house arrest until after D-Day, which must have come as a bit of a shock to themselves and their families!

The impressive cantilevered staircase in Southwick House, now the Officers' Mess. The walls are covered in paintings, photographs and Regimental history.

On the Beaches

Richard gave us an intriguing and detailed history of the invasion planning including the fact that the three British and Canadian beaches had originally been named after fish – Gold, Sword and Jelly. Churchill refused to send Allied troops to potential death on a beach named Jelly and so Juno was born. There was also a sixth beach planned but never used.

Richard gave graphic descriptions of the fate of the amphibious 'DD' tanks at Omaha beach – officially *Duplex Drive* but universally known as Donald Duck tanks. Of the first wave, 27 of the 29 launched sank which was one factor in the higher mortality rate on this landing beach.

We then had free time to admire and study the map at close quarters (the individual holes made by the map pins are clearly visible). The map shows the starting points of the massive fleet and routes to what became known as *Piccadilly Circus* south of the Isle of Wight where the armada assembled.

Four individual navigation lanes across the Channel were cleared by minesweepers for each beach – fast and slow in and fast and slow out. These were each marked by buoys and this meticulous planning meant that very few collisions occurred between the thousands of invading craft of many different sizes and speeds.

Our host Richard Callaghan explaining the history of the map and the events leading up to D-Day.

Entrance to the RMP Regimental Museum, housed in the former stable block of Southwick House.

Some members also took the opportunity to visit the Southwick Park Memorial Church – a tri-service church built in 2005 to replace the former separate Army, Navy and Air Force facilities around the country.

The church contains the names and memorials to all military police deaths, including the six RMP who were killed by a mob in Iraq after being cornered at a police station. New recruits at the camp have to march everywhere – even if alone. It was touching to see that individuals showed respect while passing the church by not swinging arms and that marching groups did an 'eyes left' (or right) as they passed. More comically, after falling out, individuals rather bizarrely still marched rather than walked away. The whole site is now on the MoD's list for disposal but Southwick House is a listed building and it would be an absolute tragedy if the map were not preserved in situ.

The original key to the map, showing the meticulous detail with which vessels were plotted.

Finally we visited what is now the Mess bar and saw the very spot where the decision to invade was taken – and also saw the original detailed weather forecast which triggered the 'go' decision.

Museum and Memorials

The next site was the Royal Military Police Museum which is housed in what used to be the Southwick House stables. This tells the story of the Regiment over the years, including the marshalling of convoys, keeping of discipline and the monitoring of the Soviet Missions in West Germany.

On leaving the camp, many members made their way to Fort Nelson – the closest Portsdown Hill Fort and now part of the Royal Armouries museum. Attractions here included the Victorian tunnels that lead beneath the parade ground to link the barracks, magazine and caponiers. One tunnel has a 'by-pass' so that soldiers could pass to the guns without going through the magazines themselves, thus ensuring that any sparks from hob-nailed boots were out of harm's way.

Recreation of barracks within Fort Nelson.

The Victorian tunnels under Fort Nelson, viewed from the counterscarp gallery. Temporary brickworks were established to provide the estimated 10 million bricks per fort required.

Ammunition conveyer leading down into the tunnels at Fort Nelson.

The original state of the magazines (one for shells and one for cartridges) contrasts greatly with those at neighbouring Fort Widley and Fort Purbrook. As described in *Subterranea* 43, these now house a Cold War Control Room and climbing walls!

Fired with Enthusiasm

On the surface the exhibits tell the story of artillery through the ages with two sections of the colossal Iraq 'Supergun' dominating the entrance and bringing to mind the ill-fated Mimoyecques V3 gun in northern France. In World War II, the site held the ammunition for all of Portsmouth's anti-aircraft guns and some of these surface stores still exist.

Cast-iron muzzle-loading guns form part of the Royal Armouries Museum at Fort Nelson.

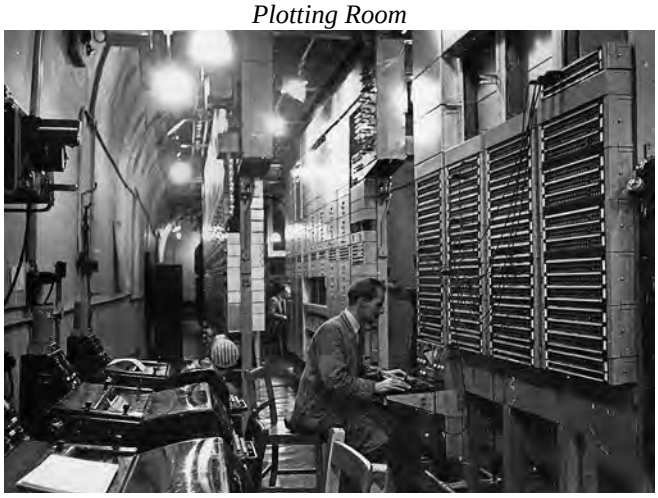
200 tonne railway-mounted 18 inch Howitzer at Fort Nelson. Built during World War I, the war ended before the piece entered service.

A real highlight was the demonstration firing on the parade ground of a World War II 25lb howitzer at 1300hrs. The cafe also did good business providing refreshments before the afternoon's fun.

World War II 25 lb Howitzer being fired at 1300 on Fort Nelson parade ground. Photo Gerald Tompsett

Plotting Room

Naval Signals Distribution Office



GPO telegraph equipment

Naval Cipher Office

The Main Telephone Exchange

Royal Navy WT Room

Naval Teleprinter Room

Movements Office

By early afternoon it was time to move to the adjacent Fort Southwick. This is very similar to Fort Nelson but with the added attraction of around a mile of WWII tunnels which housed the communications centre for D-Day. The site is currently used for 'airsoft' games but we had generously been given permission for a special Sub Brit visit. We managed to squeeze 45 cars down the track below the fort and received a warm welcome which included tea or coffee all round.

Once we'd all checked in, our guide Neil gave us a brief tour of the site and we then had free rein for a couple of hours. This suited the photographers in particular and everyone was given a map of the complex. The site was excavated from February to December 1942 by 172 Tunnelling Company, Royal Engineers. Constructed in great secrecy, it has a grid pattern – similar to Drakelow which many members will have visited.

100 feet beneath Fort Southwick

We entered through one of the emergency exits (three others are securely blocked). This led to one of five parallel tunnels which continue into the hillside and beneath the Victorian fort. At their deepest these are over 100 feet below the surface. At right angles are fourteen cross passages and at the farthest point are three staircases which were the wartime entrances and lead up into Fort Southwick itself.

The emergency exit to the WWII tunnels beneath Fort Southwick, where we made our entrance.

Virtually all of the equipment has now been removed; indeed Sub Brit member Nigel Ostler-Harris, who was with us, had been involved with this operation some years ago. The plan showed that the rooms nearest our entrance originally held support infrastructure such as ventilation, generators, telephone exchanges and toilet blocks. The plant had been removed but some of the plinths remained and most of the toilets (Ratings, Females and Officers) remained in situ.

On entering further we could see that two of the five main tunnels were narrower and would have been kept free for access purposes. The remaining main tunnels and all of the cross passages would have held offices, dormitories, stores and meeting rooms.

Exit passage from the Fort Southwick WWII tunnels, showing the steel reinforcement and corrugated iron lining – all in good original order.

At the deepest point one of the tunnels expands into an impressive double-height, double-width void which originally held the main Operations Room, with situation maps and overlooking balcony. In June 1944 around seven hundred staff worked underground with perhaps the same in the fort above so this really was a major site.

The impressive double-height former Operations Room beneath Fort Southwick. The barrels and other contents are modern and installed for the site's current use as an airsoft venue.

Former Ops Room deep beneath Fort Southwick with later airsoft barriers. The mixed construction of steel, brick and concrete can be seen. Traces of original dividing walls remain on the floor. Compare with the front cover picture from 2004 where the room is bare.

The Ascent of Man

All in all there was around a mile of tunnels to explore. Most members took the opportunity to ascend at least one of the original staircases. These each have around 170 steps in reasonable condition. The east staircase was particularly intriguing as 'stick men' had been drawn at regular intervals showing an upright man gradually bending over in exhaustion as the steps were climbed. There were no lifts provided but senior officers appeared to have had offices near the stairs (and in the deepest portion of the complex).

Staircase at Fort Southwick which would have formed the original entrance to the tunnel complex.

No charge was made for our splendid afternoon adventure but we made a sizeable donation to a charity nominated by the owner. Everyone felt this was money well spent and the day brought to life the events around June 1944 and the complexity, dedication and bravery that characterised *Operation Overlord*.

Rather than dash home, some members took the opportunity to finish the day by returning to Southwick village and the *Golden Lion*. This pub became the unofficial Officers' Mess for those serving at Southwick House and Eisenhower and Montgomery were amongst its customers. It contains plaques and other memorabilia

The top of the several 'stick men' on the risers of the east staircase showing the condition that might be reached on the ascent!

describing its own role in history and formed a splendid location to reflect on a fascinating day.

Reading

Southwick – The D-Day Village That Went to War by Geoffrey O'Connell, 128 pp, 1994, (ISBN 185253 299 8) is a nice illustrated summary of the role the area played in the D-Day invasion.

Websites

D-Day Map: http://www.ddaymuseum.co.uk/d-dayonyourdoorstep/details/allied-naval-headquarters-southwick-house

Royal Military Police Museum: http://www.rhqrmp.org/rmp_museum.html

Bob Hunt has an excellent website on the Portsdown Forts Tunnels: http://www.portsdown-tunnels.org.uk/index.html

Royal Armouries museum at Fort Nelson: https://royalarmouries.org/visit-us/fort-nelson/

And of course the Sub Brit website http://www.subbrit.org.uk

All colour photos by Clive Penfold unless stated. Archive photos from Sub Brit Collection.

Health & Safety: water on the floor

Paul Sowan

Water a foot deep on the floor will be crystal clear if it has been standing undisturbed for weeks. So you can see pits, flooded shafts, trip-hazards, and dodgy-looking floor. But bear in mind that as you wade through, you may very well stir up enough mud to make all such things invisible to persons following, and indeed to you if you return the same way later. Warn people behind you of hazards, and be sure to remember clearly what and where they are if you are coming back the same way. Nick Catford and I passed a deep flooded shaft on the left hand side in the floor on the way into a flooded mine gallery at Morwellham, so kept well to the right on the way in, and well to the opposite wall on the way out, by which time the shaft was invisible. When one of a group in a flooded tunnel in France I found myself bringing up the rear and having to proceed very cautiously as those in front had stirred up enough mud to make the water look like tomato soup: it did not occur to them to call back 'mind the pit in the floor on the right', and in fact I stumbled into it. Fortunately it was only about a foot deep, and I didn't fall flat on my face onto jagged ironmongery! I was told it was my fault, as I 'should have kept up'!

Northern France revisited: SFES Congress 2016

Linda Dixon

Abandoned beds in the WWI and WWII Étaples shelter which is cut into the side of a hill

On Thursday 17 November, five intrepid Sub Brit members rendezvoused in Arras for a weekend of talks and visits underground – oh, and some good food and company too. We were en route to attend the 39th Congress of SFES (French Society for the Study of Underground Structures).

Sub Brit members at the Christmas market in Arras – Linda Dixon, Richard West, Tony Radstone, Martin Dixon, Clive Penfold.

Martin and I travelled on the ferry from Dover to Dunkerque – a bouncy experience in the beginnings of storm Angus; while Tony Radstone, Clive Penfold and Richard West travelled by Eurotunnel, visiting the Tunnellers' Memorial at Givenchy on the way.

The *Ibis* hotel on Place Ipswich provided adequate accommodation – though the rooms are a bit on the small side and it's showing its age. We had a nice meal at *La Rapière*; like many of the restaurants round the Grand'Place its cellars are open for diners. The Grand'Place itself was busy setting up a huge Christmas market – I've never seen so many Christmas trees, apart from in a forest!

We meet old friends

On Friday morning we set off for Dainville (Pas de Calais), a nearby village where the conference was to be held. Coffee and pastries awaited us before we started on the lectures – just as well as it was an 0830 start! Each year the SFES Congress is arranged by a local group – this year it was the turn of ARRRAS (the Regional Association for Researching Underground

Anthropogenic Networks) led by Fred Willmann and Hugues Dewerdt.

Martin and I have met Fred and Hugues several times at SFES meetings and they have helped us with Sub Brit visits to underground sites in France on many occasions. We also met up with the sixth Sub Brit member at the Congress – Jean-Philippe Guichard, who lives in Lyon. As well as our French hosts and ourselves, there were German, Belgian and Dutch delegates.

Friday was given over to a number of local groups, exploring various aspects of underground study, with a view to answering the questions: *How do we define what is underground? What laws govern the underworld? How can different groups work together to best study underground history?*

So we had half a dozen short presentations (all in French), including:

* an overview of typical underground sites in the the local area of Hauts de France (Nord/Pas-de-Calais/ Picardie) by Hugues Dewerdt, representing the local group ARRRAS;
* a history of the study of the built underground across France by Luc Stevens (SFES);
* and then lots of local bodies made short presentations and triggered discussions – like the Chief of Fire and Rescue, the Surveyor from the National Institute for Industrial Environment and Risks, a representative from the Department of Land and Sea, talking about legal aspects of access and study, and finally a view from the French Ministry of Environment on actions for risk prevention.

Quite an interesting concept, to bring all your local enthusiasts and professional bodies together and help to get everyone onside to improve access to sites. The day was punctuated by a superb lunch at the local branch of 'Flunch' (the full works – *pâté* to start, a rabbit casserole, a huge piece of apple pie, red wine and coffee); we could hardly waddle back to the Congress.

The Congress is very informal so Richard and Tony decided to duck out of some of the presentations and visited the public site of Wellington Quarry – well worth a visit if you are in the area. Sub Brit visited here in 2005 (before it was opened to the public) and managed to have an extended tour of the quarries. They were used to link the centre of Arras with the front line in World War I and the different sections are named after New Zealand towns by the New Zealand miners who linked the quarries.

Going underground

Later in the afternoon we got picked up by a coach to take us to visit the tunnels of La Targette quarry at Neuville St Vaast, near Vimy. This quiet village is home to two immense WWI cemeteries – a French one with 12,000 burials and the largest German one in France, with an astonishing 44,000 burials. There is also a smaller British Cemetery and memorials to both the Czech and Polish fighters.

Cemetery at La Targette

An overgrown entrance, right on the main road, revealed a locked door which was soon opened (just as well as it was raining!) and then we were able to descend down a slippery slope. The quarry was converted and used as a refuge and dressing station in WWI. The stepped entry slope was built by the French in 1915. Within, there are several sections, as it's quite an extensive underground space, quarried from the local chalk.

Shored-up section in La Targette, with recovered artefacts

Shored-up tunnel in La Targette

The original shaft access could be seen from within – we were perhaps sixty feet underground. In many places

the shoring is still in place, there are relics from its occupation – barbed wire and bayonets, cooking pots and food containers. In places a narrow-gauge railway track was visible. Other areas had graffiti, including some dated in the 1930s, perhaps at the beginning of battlefield tourism. The local group has done much to preserve the site and make it accessible for visits.

And finally we returned to Arras, for a quick wash and brush-up before dinner arranged by SFES in *Le Comptoir des Halles* – again served underground, in a restaurant on the Grand'Place in Arras. Not quite as outstanding as lunchtime, but very tasty nonetheless. Some people managed to investigate further underground in the restaurant – persuading the proprietor to open up his cellars.

There are *boves* all over Arras – small excavations under each building used for all manner of purposes – lots for storage, but others as wine cellars, animal pens and places of refuge. In general, the first two levels beneath the houses are stone-built and known as *caves* whereas the *boves* lie deeper and are cut out of solid (chalk) rock. It is possible to visit a number of *boves* on a public tour under the Town Hall.

La Targette, upper level of tunnels looking back at shoring still in place

Saturday

An early start again to attend the Congress in Dainville – but softened by a plentiful supply of coffee and pastries. Thanks are due to Tony for all the driving he did, transporting us all to and fro. Today's presentations reflected the main theme of the SFES Congress which was "Underground Heritage and Conflicts", which in effect meant that all the presentations and visits were discussed and showed the use of underground mines, quarries and refuges which were built or converted and used in time of war.

We had four presentations in the morning – they were all in French but almost all had good pictures and photographs to illustrate the talk. With a smattering of French and a bit of translation here and there it was possible to get the gist of a lot of the material. One good aspect is that all the talks are kept very tightly to thirty minutes maximum.

So this morning we covered:

* A session by Eric Clavier (Archaeological Group of the Loire) on the small underground *annulaires* or ring-shaped structures found in the south of France. These are most strange: from a personal viewpoint, I can't understand why these holes are dug in such a strange shape and it's difficult to see how they would have been useful as a human refuge or as storage as they are so small.
* The history of Ponthieu and its *muches* in the sixteenth and seventeenth centuries. *Muche* is the local word for a refuge of this period constructed under a town or village. They usually have several long passages, echoing the village street pattern above and then have 'rooms' excavated either side; it is thought that each family would have had a room with a further room behind in many cases for livestock. Most were built during the Franco-Spanish wars of the 16th and 17th centuries.
* Underground war: universal response from weak to strong by Jerome and Laurent Triolet (SFES). This was a wide-ranging presentation showing responses to war from all over the world, including more recent conflicts in Vietnam, Iraq and Afghanistan.
* The last session was by Fred Willmann who had organised the Congress. Fred spoke about the *Muches de Vélu*. Vélu is a commune some twenty miles south of Arras. This was an excellent presentation for non-French-speakers as it included many videos taken along the passages of the shelter, all cross-referenced to a plan.

And you won't be surprised to know that 'Flunch' was excellent again – very well organised and we couldn't want for a thing.

Much(e) confusion

We hared back from lunch to jump in the 'Tonymobile' for the afternoon visits to two sites. There was a small bit of confusion as the Congress attendees were split into two groups – one did one site first and then we swapped over. Everyone set off from the Conference centre in a crocodile of cars, but that didn't help as cars from each of the groups were in the procession – but we were going to different places!

Zut alors, as they say in France. We eventually decided to follow Tony's Sat Nav, as we had the basic location information in the Congress handouts – but not the precise location. Our first visit was to Quéant to see the sixteenth-century quarry and refuge.

Just as in the UK, the French seem to use the word *carrière* (quarry) for an underground site only if stone is being extracted, otherwise they use the word *mine* (mine!). Confusingly, the French word for 'career' is also *carrière* which means a question about a local excavation can give rise to a long answer about someone's profession!

Ladders at entrance to quarry at Quéant

Our hosts had erected two short ladders to allow access and then we descended, sliding on clay infill deposits on the (very) steep passage down, but with a rope to help us (even more useful on the way back up!). This was a true quarry in the chalk of Northern France, with clear evidence of its original purpose. Fred gave us quite a long explanation which was pretty difficult to understand, so we contented ourselves with a good exploration – the actual site was not too large, so no fear of getting lost.

There were lots of 'deads' stacked up either side of the passage ways hither and thither. There was some evidence of its having been used as a refuge. A few areas were reinforced with stone pillars and it looked like some animal troughs had been built with carved hoops to tie animals to. There was also an internal well (still holding water) that most likely postdated its days as a quarry.

The Sub Brit group inside the quarry at Quéant – Richard West, Linda Dixon, Tony Radstone, Martin Dixon and Clive Penfold

Underground shelters

Our second visit on the Saturday afternoon was the *muches* of Graincourt-lès-Havrincourt 22 miles southeast of Arras. Helpfully (as with a lot of *muches*) they are accessed from beside the village church, as this was usually the highest and strongest building in a settlement. This site was new to us, although we have visited quite a number in this area with Sub Brit and Fred Willmann in the past. We descended down a brick-lined passageway which would have been constructed as stairs in the chalk bedrock, but these have worn away.

Entrance passage showing degraded steps at Graincourt muche

Muches (the word is taken from a regional word meaning 'hidden') were constructed underground to protect villagers and their possessions from marauding troops above. In those days there was little or no thought given to the feeding of the armies and so troops were free to pillage whatever they needed from the local population. Grain, seeds and sometimes animals were sheltered and hidden underground.

The *muche* was dug in the public domain (church, cemetery or *places*) with a concealed entry; the *muche* was paid for and defended by villagers. It is not unusual to pass through the remains of three or four doors (often reinforced with harder stone than chalk) on the descent to the underground refuge.

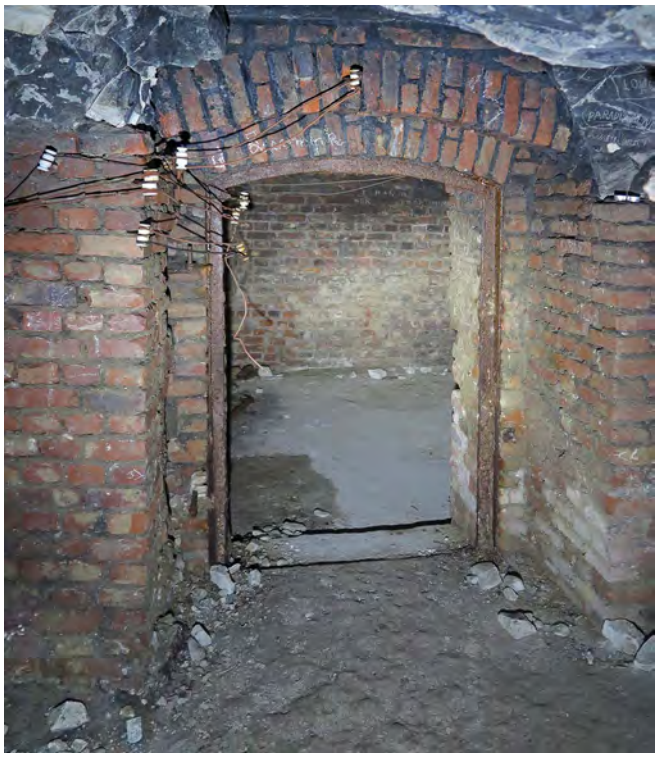
It seems that people and livestock only remained underground for a few days, or until troops had moved on. Some *muches* had ventilation shafts and water wells (or a hidden access to a surface well). Some had hearths for fires, to either cook on or to improve air flow. In some cases the smoke from these would funnel up an existing village chimney.

We wandered down the passages, around twelve metres underground. The galleries or streets are about 1.8m tall and 1.1m wide. Off the 'street' we could enter the individual 'rooms' carved out of the chalk; each would have been allocated to a village family.

German bricks

But this *muche* was used by the Germans in WWI; a lot of the site was shored up and enlarged and lined with brick, and additional brick rooms were created for defence. Here

the soldiers had installed generators, batteries and electric lighting. We could see remains of these as we explored this extensive site. One corridor, much narrower than the rest and without rooms off the side, was intriguing. Was it built as a pilot tunnel for an unfinished extension to the *muche* or was it from WWI and built as an escape tunnel? Either way, it terminated in a brick-lined shaft with rusty staples that was certainly from the period of German occupation.



German construction in the original muche

Escape shaft constructed by Germans with metal work steps

Back on the surface, we returned to Arras. The Christmas market in the square was progressing; even more Christmas trees had arrived for decoration and the bars were being equipped though not yet open. Dinner was again at *Le Comptoir des Halles*, with a reasonable amount of local red wine flowing ... Many of the French disappeared after dinner as SFES had arranged a public lecture on the underground shelters of Hauts de France by the Association ARRRAS.

Sunday

Bleary eyed again, we arrived at the Congress hall at 0800 for another morning of presentations. It's a very relaxed atmosphere, so there was the opportunity to get a coffee if the talk was a bit too incomprehensible!

* Our first talk was an interesting link between France and Australia. In many of the underground refuges around Naours there is a lot of WWI graffiti. Gilles Prilaux has managed to trace some of the Australian troops and has done research to see who survived and who didn't. Of the survivors, he had tracked down their ancestors and showed photographs of them contrasting with photos of graves of the fallen.
* Our next talk was a bit muddled. Laurent Jardin confessed he had brought the wrong version of his presentation about underground Caen in WWII – so he flicked all the way through it to be sure, then went back and started at the beginning! In particular we heard about the shelters used by up to 1,000 troops during the days following the D-Day invasion.
* Thirdly we heard from J P Champenois about the German WWII camps, bunkers and forts in reused chalk quarries around Margival, to the northeast of Paris.
* And finally, before SFES had their closed Annual General Meeting, we heard from Rowella Lowenski about a 1931 internment camp which was originally built as a market hall and then requisitioned. She has discovered a tunnel in one corner and postulated its use as a possible escape tunnel (unlikely – looks far too large).

You won't be surprised to know that we went to 'Flunch' again for our midday repast. Same high-quality food – three courses – with wine available as required. I'm glad I don't live in France – my waistline wouldn't stand all these big meals! And as on Saturday, we hopped in the 'Tonymobile' for more underground adventures.

Much(e) much(e) more

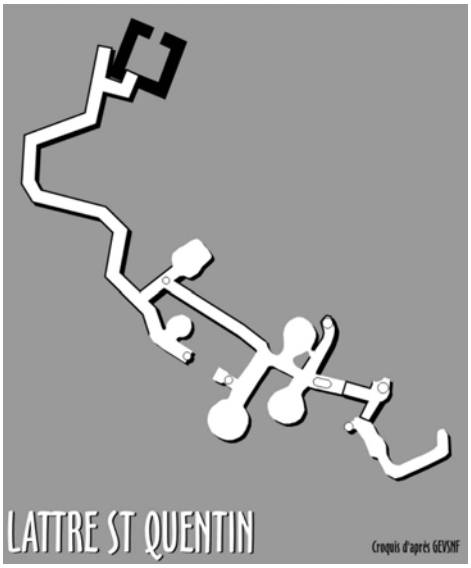
Our first stop this afternoon was to *Muche de Lattre St Quentin* at the farm of Filescamps, west of Arras. Quite tricky to find, if you rely on the Sat Nav, but luckily Martin and I had been before on our Sub Brit trip in 2005. This time the track to the farm was blocked with (a) a large farm lorry who didn't want to budge and (b) Fred's father's car which was stuck in the mud having tried to go round it. Several hands helped sort out the latter and we were on our way.

This *muche* is quite small, but beautifully constructed and has been extensively excavated and tidied up by Fred and his group, after a lot of ingress by top soil and water down some of the shafts. It is unusual in serving a farmstead rather than a village as such. The entrance passage is accessed from one of the gate towers of the farm; it has a stepped roof of fine masonry (known locally as *escaliers à redan*) and then we were into the familiar 'street' with its rooms on either side.

Entrance passage at Filescamps showing stepped ceiling of fine masonry

WWI graffiti in Filescamps muche

One feature of this site is the amount of graffiti on the walls. These range from some older examples from the nineteenth century through to British examples from WWII, dated to the invasion front moving eastwards and also to some German names from 1945.



Plan of the Filescamps muche

In between are some fine signatures from WWI from 13 Squadron and 64 Squadron of the Royal Flying Corps who were based here between January and September 1917. At this time the airfield was known as *Le Hameau* (hamlet) and although most of the accommodation was tented, back on the surface we were shown the farm buildings which were used as the Officers' Mess.

Chalk Mine and Refuges of Habarq

This was another quarry which Martin and I visited on the Sub Brit trip in 2005. Back then we entered from the Chateau whereas this time we entered through a hole in the floor of the adjacent chapel with kind permission of the Priest. The site was originally a chalk mine from the sixteenth century.

Habarq – Entrance in the chapel

Habarq is about six miles west of Arras, and for much of WWI was only a mile or so from the front line. There was a British HQ in the village and the troops created a brick-built structure underground. It is clear that soldiers took refuge

Habarq – WWI British brick-built underground HQ

here as there are many fine inscriptions on the chalk walls. Interestingly two that are almost adjoining record soldiers from Jersey (Channel Islands) and New Jersey (USA).

In WWII the Chateau was occupied by the Germans who were seemingly blissfully unaware of the chalk mine below them until one of their tanks, parked in the courtyard, fell through and into the underground workings. Sometime in WWII parts of the quarry were used as air-raid shelters and a drift entrance (now blocked off) leads up some distance to provide a third entry point.

Two superb visits and it was most interesting to see the similarities and the differences between excavations for commercial extraction and for shelter. And then back to our routine – the road into Arras, the update on the Christmas market and dinner in our usual restaurant.

SFES Dinner in Arras

Monday, November 21

Today was a bit different; the Congress closed officially on Sunday evening and today was an optional set of visits, with no presentations. Those of us who had elected to extend our visit still met at the conference centre at 0900 and then travelled in convoy (not!) to Montreuil-sur-Mer, some fifty miles away. We were due to meet at 1000 in the main square but (a) it took longer to drive than proposed and (b) surprise, surprise, they had their own Christmas market in the square!

The meeting point was the statue of General Haig in *Place du Général de Gaulle*. We did find some of the group but it turned out we weren't entering underground from the old square, so we had to refind our cars and drive (in convoy) outside the town to the base of the city walls.

Some readers may recall our Sub Brit trip in 2005 when our guide optimistically tried to navigate our coach through the narrow streets of the old town and we became stuck on a corner and had to reverse a long way. This time there was a distinctly funereal note as the lead car was a black Volvo estate travelling at around 12 mph with a dozen or so cars following.

German concrete

This was a different sort of site – still a shelter (to follow the theme of the conference) – but built by the Germans as a bunker for barracks under the city walls.

We convened in the dry moat of the city and entered by the northern door. There were to have been two sets of barracks, but the southern section was unfinished and remains inaccessible.

Author and Frederick Willmann in tunnels at Montreuil with guide

Entrance was down a few stairs (due to the moat having been infilled slightly since the bunker's construction) and then a dog's leg left and right turn, allowing a small machine gun post to preside over the entrance passage. The construction is of four long arched tunnels set in a rectangle, the north-south passages being wider would have been the accommodation. The extension of the entrance passage runs approx. forty metres into the hillside; at the far end, on the left, are the remains of a kitchen with some of the equipment still in situ.

Montreuil – kitchen in German barrack block and corridor stretching alongside barrack rooms

The wider passages still have concrete partitions in place dividing the corridors from the dormitories and offices constructed alongside. As always, we felt the need to go down all the tunnels and stick our noses into most of the rooms – all pretty much the same, but with remains of ventilation, lighting and heating and even of bunks in one of them.

So, four hours without food – you can guess what happens next! We set off once again (another convoy) to a farm set in the countryside for a brilliant meal with a local menu. Our *patron* was liberal with the beer, wine and cider and baked fresh rolls for us on the open fire. The

result was probably the best meal of the weekend and we were stuffed once again.

Surprise guests

Our final visit of our SFES weekend was in Étaples, a further ten miles away, on the coast. We eventually made contact with the rest of the group (we'd abandoned the convoy principle but sadly there were two large car parks next to fish restaurants). We were to visit a shelter used in both WWI and WWII cut into the side of the hill. But it was accessed through a private house!

So there we were, fifty or so strangers, with muddy boots (even muddier coming out) and boiler suits and helmets, trooping through the owner's front room and out the back and to the end of the garden. Luckily the property still seemed to be in the process of renovation, so we didn't damage his front room too much.

Entrance to the Étaples shelter through a house

This was a site like no other I have visited. Although it was clearly an extensive underground chalk quarry to start with, it had been adapted for use as a refuge. The pillar-and-stall workings are still evident, with piles of 'deads' in places. Remnants of wartime occupation abound – pots and pans, jerrycans and gas masks.

Abandoned beds in the Étaples shelter

What was most remarkable was the number of beds left underground. It looked like the local people had brought in iron-framed beds from home – there were all sorts of models: double, single, folding, and some cots. Certainly no bunks for troops. What seemed strange was that they hadn't been recovered after the war – so perhaps there was a sad ending for many of the occupiers. There must have been sixty or so throughout the site.

Regrettably there is ingress of mud and water from above so some 'rooms' are no longer accessible and who knows what they hide... But what a wonderful and evocative place.

And finally

We drove back to Arras tired and happy – I think we kept Tony (who was driving again) awake with our snoring. There was no formal dinner tonight, so the five of us went to one of the many restaurants dotted round the square – Tony's choice as his reward for all the driving. A jolly good ending. We stayed one final night in the *Ibis* and went our separate ways in the morning.

Lochnagar Crater

Tony, Richard and Clive visited the enormous WWI Lochnagar Crater en route to the Channel Tunnel while Martin and I visited a few more of the Commonwealth War Grave cemeteries. One was in an old quarry (one of at least three *Quarry Cemeteries* in northern France), where a gravestone marked the final resting place of Fergus Bowes-Lyon, the late Queen Mother's brother. He was wounded in a huge artillery barrage and died of subsequent bullet wounds in the Battle of Loos.

After a spot of French shopping (some things are still cheaper!) we boarded the ferry at Dunkerque, now a very quiet place as traffic has diminished. We boarded a huge ferry and endured another bumpy crossing which was somewhat late due to the remains of the storm.

The 2017 Congress of SFES will be in Laon, northern France – maybe we'll see you there!

All photos by Clive Penfold

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Williamson's Tunnels, Liverpool – Revisited

Phil Catling

View of Paddington taken from the base of the steps down from Level 2 to Level 3, showing the Boote Chamber in Level 3 into the Gypsum Chamber in Level 4

Deep under the quiet Liverpool suburb of Edge Hill lays a strange warren of tunnels. Dug out of the ground and lined with brick by an army of workers under the direction of a maverick retired tobacco baron called Joseph Williamson, the tunnels and caverns form a maze that is still being discovered and mapped today. Excavation, clearance and recording of the tunnels is coordinated by a local charity *The Friends of Williamson's Tunnels* and weekly underground days are held for volunteers to come and help. Regular open days and tours of the two main sites are also arranged.

Long supported by Subterranea Britannica, the Friends helped arrange the society's Liverpool weekend in 2012 and have been the recipients of a number of Sub Brit grants for safety equipment and skip hire. Recently a small number of Sub Brit members were in Liverpool and were tasked by the Committee to see how work had progressed since the 2012 visit. Little did we know that we would be heading four storeys underground and would experience what one member of the team called 'the most amazing place he had ever seen'.

King of Edge Hill

On retirement from the tobacco trade in the first decades of the 1800s, Liverpool magnate Joseph Williamson invested in the fresh clean area of Edge Hill. Based east of Liverpool's polluted and noisy centre and away from the slum areas surrounding the docks, over the next 35 years he built an empire of large houses, cut-and-cover tunnels and a labyrinth of underground spaces (possibly using existing quarries in some areas).

Williamson vetted the occupants of the houses he built and carefully regulated the renters of the underground spaces, becoming known as 'The King of Edge Hill'. Williamson's known tunnels are primarily bordered by Mason Street, Grinfield Street, Smithdown Lane and Paddington.

There is no record of why Williamson had these tunnels constructed, and a variety of fanciful tales have grown up over the centuries; my personal favourite is that

Williamson was a member of an early 'doomsday cult' and was expecting to take refuge in the tunnels with other cult members after an apocalyptic event. The most cited reason is that Williamson, having risen from a poor background, used the tunnels as a form of charitable 'make-work' for redundant soldiers returning from the Napoleonic campaigns.

The workers would learn skills, have a small but steady income and eventually move on to help create much of the extensive tunnel network used by early railways into Liverpool. Although there may have been a charitable aspect to the tunnels' construction, Williamson later made a huge fortune from renting out the spaces for a wide variety of uses!

The surviving frontage of Joseph Williamson's house in Mason Street. Photo Nick Catford

After the death of his wife in 1822, reports have Williamson throwing himself into his constructions, spending days underground and designing more and more fanciful spaces, including arches and tunnels to nowhere. He seemed to revel in cultivating a gruff no-nonsense manner, reportedly roaming Liverpool and London in scruffy dress and caring little what others thought. By the time he died in May 1840, the 70-year-old tobacco baron and property magnate had created one of the wonders of the underground world.

Down Tools!

On 1 May 1840, as news of Williamson's death spread, tools were downed, stone blocks remained uncut and the tunnels rapidly entered a twilight world of myth and refuse. Every decade or so the tunnels would be 'rediscovered' as railway tunnels cut through them, the large houses above were demolished or foundations being dug broke through. As the years passed the tunnels were backfilled with a wide variety of building rubble and for many decades some of the refuse of Liverpool was tipped into the tunnels rather than landfill.

Over the centuries various attempts to map the tunnels were made, including one by the local historian James Stonehouse soon after Williamson's death, and others by the Territorial Army and Charles Hand, president of the Historic Society of Lancashire and Cheshire. The most up to date map is based on extensive work by the Friends and includes such modern trickery as 3D scanning and 360-degree photography.

Formed in 1996, the Friends of Williamson's Tunnels is a charity dedicated to excavating, interpreting and improving access to the tunnels on two main sites: Williamson's House and the four-storey-deep Paddington site. Sub Brit members are always welcomed warmly and usually given a bucket to help clear the remaining spoil! Clearance of the Paddington site was concluded in November 2016 and efforts then moved over to the House site where new discoveries are posted on their very active social media.

Looking through the doorway into Level 2 at Paddington, showing some of the artefacts found by FWOT and Williamson's love of intersecting brick vaults

The 2012 Sub Brit visit

Split into groups and dodging the Liverpool marathon which had closed the centre of the city, Sub Brit members made an interesting sight as we trailed back and forth. Clutching hi-vis and helmets on a scorching day, we criss-crossed the city. Unfortunately the recent collapse of the Liverpool Overhead Railway tunnel had removed that one from the list, and a missing key meant Toxteth reservoir was inaccessible.

Other sites delighted – from the huge railway tunnels and cuttings last used to film a Landrover advert to the delights of the wall paintings in the Littlewoods air-raid shelter. Surely these Williamson's tunnels couldn't compete? Someone mentioned they had visited a serviceable but a bit too clean visitor centre with a tunnel – was that the one? As we headed into Edge Hill we didn't know what to expect.

As one heads up to the Paddington site, it's difficult to see what all the fuss is about – a hatch in the ground and an old school visitors' book sit by a stack of hard hats with varying levels of mud on. Sub Brit of course need none of these – we have arrived fully kitted out. As you descend into the hatch, the world takes a bizarre turn, metal scaffolding steps and rock-hewn walls vie with brick, course upon course of fine brick – they must number in the millions.

Excellent guides take the groups through strange tunnels and chambers, small paths chopped through centuries of rubble and waste. At random points holes now grated are cut through the floor, showing another level below us. The guide mentions that the holes were cut to allow yet more rubble to be tipped into the lower levels.

Level 2 in the Paddington section, with the entrance stairway through the arch to the right

Weird items line the walls, broken bottles and crockery, industrial signs and twisted pieces of metal, all dug from the filled tunnels. Centuries of Liverpool's past, lined up on display as if this were an alternate reality department store. Interspersed with these are plaster skulls left over from the filming of an Edgar Allen Poe movie. We are led down through the levels, told that the space we stand in (the 'ash chamber') has been sounded – old school-style with a metal rod – and that many feet of ash and gypsum need to be removed. Then it's back into the fresh air.

Elliptical Arch section of the Wine Bins under Williamson's House site

The Wine Bins under Williamson's House site

After a short walk to what looks like a half-demolished building site we are introduced to Mason Street; Williamson's House façade still stands, fronting a large space with hatches dotted around. There are at least three areas to be seen here and we split again as the volunteers show their safety knowledge and wrap everyone in harnesses. Dropping into the first space we see rack upon rack of wine – added for the Poe filming but not too far from the original use of this space directly below the house itself; cellars and storage would suit this area well.

Then to the Crown Jewels – hitching up to a tripod we descend down into the main Mason chambers. Squeezing into the 'Gash', we drop down and down between walls carved so that each shoulder scrapes on rock. The steps are worn from use and the only light comes from portable work lights and our own torches. As the Gash widens, we enter a huge chamber, 64 feet long and 27 feet high, known as the Banqueting Hall.

The 'Gash', the current entrance into the Banqueting Hall

Only partially cleared, the space has a steep slope of rubble and infill ramping up to the far end, which of course we immediately race up to take photos of the hall. Our guide explains that the small hole in the ceiling of the hall leads into a chamber next to the wine bins we were in earlier – another example of the levels and chambers slotting together in a three-dimensional maze. We leave amazed at the volume of work the volunteers have already done and intrigued to see what they find next.

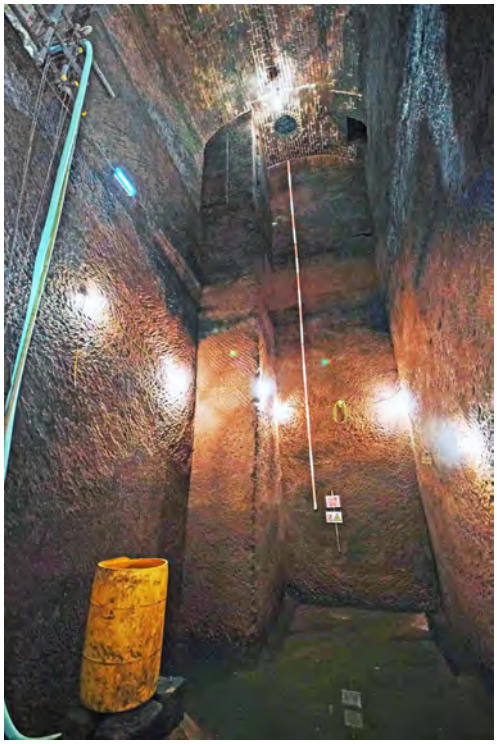
Sub Brit's 2016 visit

Four long years of bucket moving and over one hundred skips later, Sub Brit returns to Williamson's Tunnels. During a day-trip under Liverpool we are invited to drop in and see the Friends' progress. Although I've been following

Paddington - Level 3 looking from the Lomax Chamber towards the Boote Chamber

View from Level 3 (the Lomax Chamber) at Paddington looking towards the Gypsum Chamber beyond the stone/brick buttresses. SubBrit member Bob Clary helps give scale

The Ash (or Coke) Chamber, the deepest part of Paddington being 12m from chamber floor to the barrel vaulted brick roof (the chamber floor is 18m below ground level). As this chamber is below the water table, an estimated 2 litres per hour seeps through the rock into the chamber



the volunteers' work on social media, this is my first return trip to the site since 2012. We walk up the familiar street to Paddington and explain who we are – a warm welcome is given – despite the team only expecting a single Sub Brit visitor and our group turning up totalling nine.

We are led down to the spaces seen in 2012, but there seem to be changes, new tunnels branch off and the large banks of refuse and infill have gone. Bucket after bucket passes us in a chain process from the depths, going from pulley to pulley and hand to hand before being dumped in the latest of a long line of skips. We head down the steps to level two – now empty and superseded by levels three and four.

As honoured guests we are allowed down much further than ordinary visitors. We reach a bedrock chamber, vaulted with brick – the mark seen at eye level in 2012 is now far above us, well out of reach. The chamber is buzzing with activity, volunteers working to empty the last buckets from level four ready for a celebration the week after. This will mark the completion of emptying Paddington.

The Banqueting Hall looking toward the large mound at the end; the Gash is behind the camera

Looking around in delight we see a rickety scaffolding staircase leading down into the Ash Chamber – they were right, there was a huge amount to clear. Now suspected to be an early underground water reservoir, the chamber is massive, larger than any of us have seen before for this era. The engineering to build this in the 1830s is unbelievable – especially as it lies beneath other tunnels – no cut-and-cover here! The chamber soars 39 feet above us, with vaulted roof and course upon course of the familiar brick.

Heading back over to Mason Street we find that the Banqueting chamber entrance is now clear – not so much scrambling this time – although again new tunnels and areas are branching off. We are allowed to shimmy up ladders and through holes, and told of the plans to clear these areas (and possibly rename the Gash). After finishing Paddington, this has been the focus of volunteer work and the first five skips of material have been already been removed. They must be serious as they have just installed their first toilet facilities!

Inside the Banqueting Hall looking back towards the 'Gash'

Sandstone Arch at the bottom of the long ladder when accessing the Banqueting Hall section under Williamson's House site. At the blocked far end (since the visit this has been dug out) is what the FOWT believe to be the entrance leading to the Great Tunnel

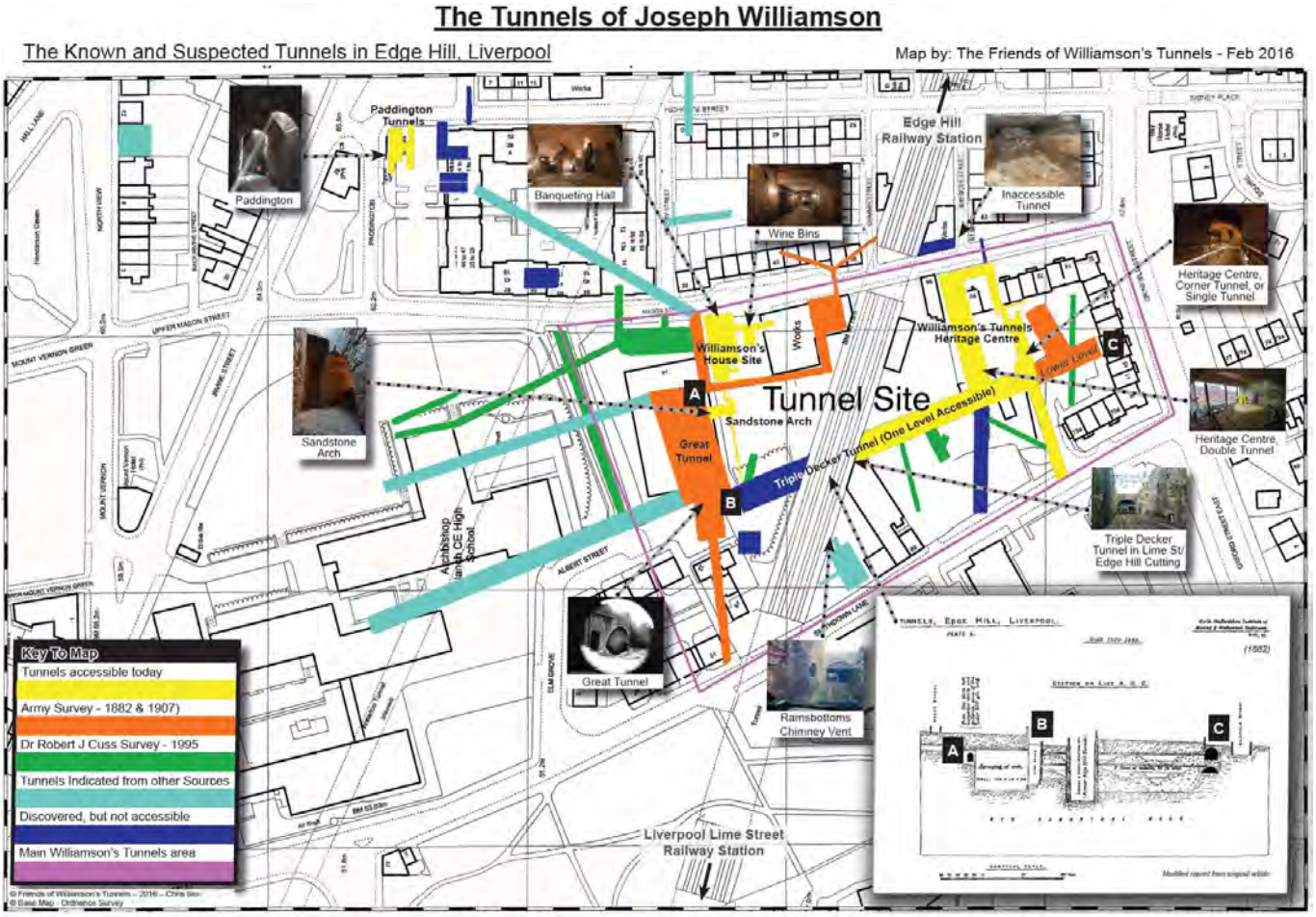
SubBrit member Jamie Bentley resurfaces from the Banqueting Hall section under the watchful eye of a FWOT volunteer (the ladder is around 5m and fall arrest equipment is used for safety)

The Grand Tunnel

The work done by the volunteers at Williamson's Tunnels is truly stunning; they have enabled access to spaces that would have been lost to history and their work ethic is incredible. I fully expect them to have emptied Mason Street and be well on their way to 'The Great Tunnel' before the year is out.

The group are friendly and welcoming, happy to escort visitors either on a workday (usually Sunday) or if you contact the group they will arrange a guided tour. Massive thanks to Chris Iles, Lynn Mills and the rest of the team at the Friends of Williamson's Tunnels for the warm welcome and excellent guided tour.

Phil Catling is an archaeologist and historian working for Stockport Council Heritage Department based at Staircase House and the Stockport Air Raid Shelters Tours. Phil is trained in High Risk Confined Spaces and regularly posts photographs and reports on his Tunnel Inspector Facebook page. A member of Subterranea Britannica since he helped to host the 2010 Manchester study weekend (and missing all the good stuff), Phil is on the Sub Brit Committee, assists with social media and arranges occasional Sub Brit visits in the North West.



Many Happy Returns

Martin Dixon

Sub Brit gets a regular stream of enquiries from the public, and answering them is an interesting way to spend an hour or so a month. Questions usually follow one of a few common threads such as asking permission to use photos, requests to identify 'discovered' features or suggestions for locations for filming or exhibitions. Once in a while, however, a request comes through for something quite different and this was the case in late October 2016.

Three of the recent Empire Windrush immigrants on the top floor of Clapham South shelter in July 1948. Eric Drysdale is in the middle, siting on the top bunk and adjusting his tie

The request was for a copy of one of the photos on our website of Clapham South deep-level shelter. This was one of eight deep-level air-raid shelters built in 1942 beneath existing London Underground stations; they were planned to accommodate 9,600 people each. By the time of their completion the London blitz has reduced in intensity and so the shelters remained closed until 1944 when the threat of V1s and V2s caused some of them to open their doors to the public.

As many readers will be aware, Clapham South deep-level shelter was also used post-war to accommodate immigrants from Jamaica who travelled to the UK aboard the *Empire Windrush* (see panel) in 1948. Their arrival was not expected by the authorities and hence the Clapham shelter was pressed into use. The nearest labour exchange to Clapham was in Coldharbour Lane, Brixton and thus it was a wartime air-raid shelter that indirectly led to the vibrant West Indian community that still thrives in the area.

What made the request by Yvonne Hart particularly intriguing is that the photo includes a picture of her father, Eric Drysdale, who was one of the original 492 *Windrush* passengers. The passage to the UK cost him £28 and the ship docked at Tilbury after its transatlantic voyage.

Having arrived in the UK, Eric joined the merchant navy until marrying and moving back to London. He then worked for 32 years as a Post Office engineer until retirement. Many of the other immigrants found jobs with London Transport but others included Sam Beaver King (the first black Mayor of Southwark) and a number of calypso musicians.

Eric Drysdale in November 2016 at his home in Canada Water. His daughter Yvonne is handing him the framed print of the 1946 photograph

Empire Windrush

Empire Windrush was built as *MV Monte Rosa* in 1931 for the Hamburg South American Shipping Company. The passenger capacity was 1,150 in cabins and 1,350 in dormitories. It was built to carry German immigrants to South America but when the market failed to materialise it operated as a cruise ship in the Mediterranean and beyond.

During World War II she was requisitioned as a troopship and took part in the invasion of Norway. Later she acted as a recreational ship attached to the battleship *Tirpitz*. In 1944 *Monte Rosa* was in the Baltic Sea and rescued German troops from Latvia and elsewhere who had been cut off by the advancing Red Army.

In May 1945 *Monte Rosa* was captured by advancing British forces at Kiel and became a 'prize of war'. Becoming a troopship, she was renamed *Empire Windrush* (the *Windrush* after a tributary of the River Thames). She made just one Caribbean trip, most of her other duties being to the Far East via Suez. Her days ended in 1954 after an engine room fire which killed four sailors. She was taken in tow but sank en route to Gibraltar and still lies 30 miles off Cape Caxine in Algeria.

Largely from Wikipedia.

Eric was approaching his 90th birthday and Yvonne wanted to present a framed photo to help celebrate this milestone. We always try and respond positively to enquiries and with the help of Nick Catford were able to send Yvonne a good quality print of the photograph. In return, Yvonne sent us an image of her father admiring the framed 1948 photo. It now has pride of place on the wall of his home. We wish Eric many happy returns and are delighted to show the 'then and now' photos in *Subterranea*.

Some of the hundreds of passengers aboard Empire Windrush as it docks at Tilbury in June 1948

Hypogea 2019: Underground Bulgaria

Martin Dixon

There's nothing like planning ahead so here's early warning of a special underground event to be held in 2019.

The UIS (International Union of Speleology or Union Internationale de Spéléologie, in the original French) is the international body for caving and speleology. Founded in 1965, its members represent over 60 countries from all five continents. The vast majority of its work concerns the exploration of natural caves.

There is however a recognition that the exploration of man-made space also has its adherents and within the UIS is an 'Artificial Cavities' Commission. It's slightly contrived terminology but what matters is that it allows us to interact with enthusiasts from across the world whose prime interest is man-made underground structures and spaces. Most of the focus of the group is on historic rather than current excavations and the Commission brings together those who passionately believe in the value of underground space in telling mankind's story.

The UK representative on the Artificial Cavities Commission is our Chairman, Martin Dixon and the group includes representatives from many other, mostly European, countries. Many of the other representatives are well-known to Sub Brit and have helped with our own visits and spoken at our day meetings. The current President of the Commission is Mario Parise from Italy. Every two years an international 'Hypogea' conference is arranged, at which presentations and site visits are made. Hypogea 2015 was held in Rome and in 2017 it was the turn of Turkey to host the event in Cappadocia. For 2019, the plan is to hold the event in and around Varna in Bulgaria from 20-26 May. Sites to be visited here include underground

monasteries, churches and catacombs as well as day to day living spaces. There are also likely to be stone quarries and other mines and tunnels to visit.

It's too early for booking arrangements to be known but why not make an early entry in your 2019 calendar and consider joining fellow enthusiasts for an exciting glimpse into underground Bulgaria?

Llandudno Junction - the bunker that never was

Steve Fox

The Marl Cold Store at Llandudno Junction in 2016. Photo Russell Barnes

For most of the Cold War, Britain's planners assumed that World War III would start, and quickly end, with a cataclysmic nuclear attack. The resulting damage and loss of communications would make government on a national scale impossible and so a devolved system of Regional Government which could operate closer to the survivors was planned for.

Each region would be governed by a Regional Commissioner who, together with a staff of around 450, would be based in a protected Regional Seat of Government (RSG). To provide an additional tier of government between the RSG and the local government authorities who would be responsible for looking after the survivors, the regions were divided into sub-regions each of which would have a protected headquarters.

These were initially designated as Sub Regional Controls (SRC) but over the years this designation was changed to include Sub Regional Headquarters (SRHQ), Sub Regional Controls (again), Sub Regional Headquarters (again) and Zone Headquarters. Finally, in the 1980s this two-tier structure was abolished in favour of a single tier with the Regional Commissioner who would operate from one of the former sub-regional bunkers, now designated as Regional Government Headquarters (RGHQ).

Wales is divided

In this way Wales, which was Region 8 for civil defence purposes, should have had its RSG at a new, purpose-built bunker at Llandrindod Wells, but this was never built and a temporary RSG planned at the barracks in Brecon until the idea of permanent RSGs was abolished in 1965. Wales would have been divided into two sub-regions with 8.2 in the south and 8.1 in the north. Sub-region 8.1 would be responsible for the counties of Gwynedd and Clwyd. (Welsh readers may object to this geographical generalisation as local government in Wales changed several times during the years under discussion but these names seem to be the most appropriate and in any case the overall boundaries of sub-region 8.1 did not change.)

In the mid-1960s some former ammunition storage tunnels at Brackla to the west of Cardiff were converted to be the headquarters for sub-region 8.2 and they continued to serve until the regional government system was wound up in the early 1990s. However, sub-region 8.1 would never have such a headquarters. This article explains why sub-region 8.1 was left unprotected and in doing so shows the varied Home Office plans for these headquarters and the problems it faced.

Civil defence regions and sub-regions in the mid-1980s

two NATO Civil Wartime Agencies, and possibly to store gold evacuated from the Bank of England.

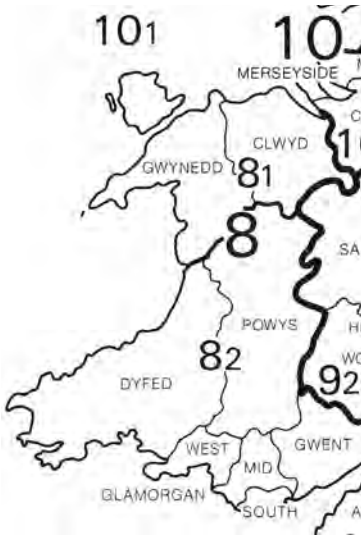
In 1968 civil defence was placed on a "care and maintenance" basis. In practice, this meant that no further work would be undertaken on the Sub Regional Controls, as they were then called, except to stop them deteriorating and plans to build new ones were mothballed.

Some refurbishment and planning work was done in the 1970s on what had been redesignated as SRHQs but in 1979 the new Conservative government came to power, and a Home Defence Review which soon followed announced that the SRHQ estate would be completed by 1985. The plans called for seventeen SRHQs in England and Wales. Scotland would have three Zone Headquarters which were roughly equivalent to an SRHQ with a separate "Scottish Central Control". Northern Ireland should have four Area Controls and a Northern Ireland Central Control.

The state of the estate in England and Wales in March 1982 is shown at Table 1. In Scotland the ZHQs at Barnton Quarry, East Kilbride and Anstruther together with the Scottish Central Control at Kirknewton were all below 'recommended standards. Similarly, none of the

Rhydymwyn Rejected

Protected headquarters for the sub-regions were first considered in the mid-1960s and some were chosen and equipped. However, little money was available and they were mostly sited in ad hoc premises and were far from ideal. They also used existing, usually government-owned premises and the absence of a headquarters for sub-region 8.1 may initially be due to a lack of any suitable premises in the sub-region. The tunnels at Rhydymwyn near Mold in the northeast of the sub-region were suggested at various times but never adopted, possibly because of other ideas to use them as the wartime home for



Plant house at the entrance to the tunnels forming RGHQ 8.2 at Brackla which was totally different to the proposed RGHQ 8.1. Photo Nick McCamley

Table 1 - SRHQ estate in England and Wales 1982

Site	Sub region	Status
Hexham	1.1	Work had started to convert a cold store in Autumn 1981. Completion due March 1983
Shipton	2.1	Structural work on the new 4th floor was complete but communications had not been installed. Due to be operational by the end of 1982.
Skendelby	3.1	Delayed major rebuilding work due to commence in 1982. Completion due mid-1984, until then considered to be non-operational.
Loughborough	3.2	Major conversion work on former cold store was completed in 1978. Could be used on an ad hoc basis until full communications installed.
Bawburgh	4.1	Second generator needed but otherwise operational.
Hertford	4.2	Second generator needed but otherwise operational
Kelvedon Hatch	5.1	New generator and other modifications needed but considered operational.
Dover	6.1	Major work needed to bring up to standard. Being costed by PSA.
Basingstoke	6.2	Operational although roof leaked.
Ullenwood	7.1	Too small but could be used with reduced complement. Building of replacement at Chilmark to start end 1982
Hope Cove	7.2	Part unsuitable and improvements needed. Not to commence until Chilmark operational.
	8.1	no site selected
Brackla	8.2	Operational
Swynnerton	9.1	Operational
Drakelow	9.2	Major refurbishment work started, due for completion mid-1983. Until complete considered non-operational
Southport	10.1	Too small and liable to flooding but usable in an emergency. New site to be selected.
Hack Green	10.2	Conversion work due to start. Completion due 1984.

designated control buildings in Northern Ireland were considered to be satisfactory.

There is however an obvious gap in the 1982 list. Although some of the SRHQs were not fully operational nothing at all is listed for sub-region 8.1 which covered north Wales.

Sub-region 8.1

With new impetus behind the SRHQs from 1980 a site for a headquarters in the 8.1 sub-region was looked for and eventually found. But nothing ever came of these plans. In fact, sub-region 8.1 was the only sub-region in Britain never to have a headquarters.

The reasons for this situation can be dug out of the recently released files at the National Archives and reveal many interesting aspects of the workings of the Home Office's department responsible for civil defence, and how it tried to complete the SRHQ estate by1985. This would fulfil the undertaking to do so that it had given to Patrick Mayhew, the new Minister of State at the Home Office responsible for implementing the conclusions of the 1980 Review.

By early 1981 Ministers had decided that the SRHQ estate must be completed and the Home Office asked the Property Services Agency (PSA) to look for a site on which to build a headquarters for the 8.1 sub-region. The Home Office wanted a clear greenfield site at least 100 metres by 60 metres on which to build the new SRHQ using the plans and specifications prepared in the early 1970s for the site for a new SRHQ 7.1 at Chilmark in Wiltshire. It also expected to use these plans for new bunkers to replace the existing sites at Southport and Dover.

The PSA then appears to have used the local knowledge and contacts of the staff at its Colwyn Bay office to look for a site. The Home Office was not very specific about its needs saying, for example and rather vaguely, that the site should be away from housing on an "out of sight, out of mind" basis but with access to a public road. The PSA's first suggestion – made in November 1981 – was to use part of a large army training ground at Kimnel Camp in Clwyd.

The army however did not want to give up any part of this site and the PSA were asked in January 1982 to extend their search to "disused caves, tunnels or other underground accommodation" in Clywd and Gwynedd. This brought a quick response from the PSA saying it knew none of these existed because it was involved in litigation relating to Manod Quarry in Gwynedd and it had been looking for a replacement.

Manod Quarry had been used to store art treasures during World War II; it had been retained after 1945 but by 1982 the government's lease, which had expired, had become the subject of a legal action by its owner. The PSA did however mention that they had some "caverns" at Rhydymwyn near Mold in Clywd but the Home Office quickly rejected these saying they had been considered before.

The Home Office then considered if the 8.1 sub-region could in the event of war be run from the as yet unbuilt SRHQ planned to be developed at Hack Green in Cheshire. This would of course be in the English sub-region 10.2 and the idea of governing, post-World War III, the nationalistic northern Welsh counties from England was quickly dismissed. A smaller, almost nominal SRHQ was also considered but the idea of simply not building SRHQ 8.1 at all was dismissed because Ministers had already agreed to it.

Marl Cold Store

The PSA then suggested the Marl Cold Store at Llandudno Junction in Clwyd. The Home Office however was 'not too enamoured' with the Cold Store apparently because they were already converting an identical building in Loughborough and the project was not going smoothly. They were also concerned that radio communication from the low-lying site would prove difficult.

The Marl Cold Store in 2016. Photo Russell Barnes

Once again the Home Office asked the PSA to look for a site, saying they would prefer one where the bunker could be semi-sunk (that is, built with the lower level underground and the top level built on top of it and then mounded over) and preferably in an isolated position, but adding that both of these criteria could be waived if necessary. Moreover, a radio route into the site (which would be problematical throughout north Wales given its mountainous nature) was not vital.

By this time the pleas to the PSA from the Home Office were starting to sound desperate. The PSA was told that even if the plans drawn up for the Chilmark bunker were to be used it would take up to three years to complete, so a start in north Wales had to be made as soon as possible. This apparent rush may have been caused by the need to complete the project by March 1985 as the necessary money was budgeted for on a yearly basis and if not spent by then it would be lost. Another reason may have been that Home Office ministers had been told by their bureaucrats that the SRHQ building programme was on schedule when it obviously was not.

In reply the PSA again mentioned Llandudno Junction but they also said that there were relatively few Crown-owned sites in north Wales and they would have to look on the open market, although adding that purchasing such a site would have a cost impact. They told the Home Office that their local office had identified two small pieces of land. One was a smallholding, apparently little more than a bumpy field, and the other was not actually on the market but the local PSA man knew its owner and thought he might be prepared to sell.

Llanberis Pits

At this point another site was suggested by the PSA which would show that whilst the Home Office thought its needs were paramount, neither the PSA nor the Ministry of Defence shared its view. This new site was called Llanberis Pits which the PSA was in the process of selling on behalf of the Ministry of Defence. In fact, Llanberis Pits had been proposed by the PSA to the Home Office in 1980 but the Home Office was unwilling to make any commitment at that time until the results of the Home Defence Review completed in 1980 had been considered, and they therefore told the PSA that they would not object if the site was disposed of.

But the PSA had not sold the site in the intervening 30 months and the Home Office do not seem to have noticed that Llanberis Pits had been suggested before. There were actually four sites at Llanberis but Site 1 was thought to be potentially the most interesting. In fact, this site is known to Sub Brit as the Llanberis RAF Reserve Depot. Site 1 was a former slate quarry which was acquired in 1939 for conversion into a major bomb store for the RAF. A massive two-storey storage bunker was built on the floor of the quarry and then, for protection, topped off with slate rubble to a depth of some forty feet. Unfortunately, the bunker could not take the weight and a large part of it collapsed in 1942 burying thousands of tons of bombs.

During the 1950s the collapsed part of the site was cleared and levelled and the remaining storage tunnels emptied. The Home Office was however not interested in the remaining underground section of the depot but in the cleared area which could have been used to build their favoured copy of the Chilmark SRHQ. In a letter to the PSA they described it as the first suitable site they had found.

Llanberis Pits Site 1 showing the cleared area with the surviving galleries beyond. Photo Nick Catford

However, there was a snag here in that the owner, the Ministry of Defence, was actively trying to get the PSA to sell the whole site. It was not interested in just getting rid of Site 1. More inter-departmental problems followed. The Home Office was told that their Minister would have to make a formal approach to the PSA but the PSA was anxious to sell the site as quickly as possible. They were in the final stages of a lengthy disposal process and were not keen about the delays the Home Office's deliberations were causing.

The PSA said it could transfer the land to the Home Office but they would have to take all four sites, not just Site 1.

As an alternative the PSA offered to investigate selling just the other three sites but if this option failed it would have to include Site 1 in the sale and moreover the Home Office would have to meet the costs of the wasted work. In the meantime it would continue with its plans to sell the whole site but would consult with the Home Office before it put the site on the market.

A change in strategy

But while these discussions were going on major changes were being made at the strategic level which would have significant impacts on the SRHQ estate.

In 1982 the Machinery of Government in War Committee had decided that the two-tier structure of post-strike regional government based on regions and sub-regions would be reduced to one based on the SRHQs in the sub-regions. Most regions would have two of these protected headquarters so that there would be a reserve in case one was knocked out.

A Working Party on Regional Government (in effect a committee of civil servants representing the departments with an interest in civil defence) was set up to oversee the implementation of the new structure of regional government. One of its first decisions was to reduce the nominal staffing of an SRHQ from some 190 to around 130. This was a significant reduction and would mean that future SRHQs could be much smaller. This would affect the plans not only for sub-region 8.1 but also for the replacement sites for Southport (10.1) and for Dover (6.1) which were being looked for. Of equal importance was its decision that wherever possible new SRHQs should be based on converting existing buildings rather than much more expensive new-builds.

At the same time and of equal significance was the reconsideration of the amount of physical protection the SRHQs would need. Since the late 1950s the regional-level bunkers had been designed to have a 'protection factor' or PF of 400. This would mean that the effect of radioactive fallout from the H-bombs would be 400 times less inside the bunker than outside. They should also be able to survive an over-pressure from blast of 1.5 psi although in most instances this came automatically from the protection needed to give the PF400.

These two figures dated back to the days of the RSGs but no one seemed to know how they had originally been decided. (In contrast, the Royal Observer Corps semi-sunk group controls had been built with a PF of 1,000 and blast protection up to 10 psi.) But such physical protection came at a price, so if the level of protection were reduced the conversion costs would also be reduced and cost was always a major consideration in civil defence planning.

This led to considering the situation of 8.1 in more general terms than had been done before when the Home Office had simply worked on the basis that the sub-region should have a bunker and that it should be built to the same levels of protection as before. North Wales was considered to be unlikely to suffer from any direct attack and the fallout levels from H-bombs exploding elsewhere could be expected to be relatively low.

The sub-region consisted of only two counties so the administrative problems would be much lower than in sub-region 8.2 to the south, which had five. The planners also thought that the 8.2 SRHQ in Wales (at Brackla) would be likely to survive as it was a long way from any expected target.

Given these factors could the whole of Wales be run from 8.2 post-attack? Not only did this rethink mean that SRHQ 8.1 was less likely to be needed in war and therefore was given lower priority than say a replacement for the Dover tunnels housing SRHQ 6.1, but that it could also be built to a much lower level of protection and a PF of only 100 was now considered to be acceptable.

Working on these revised criteria the Home Office officials came up with three suggestions:

1. A new build which would cost some £2m (although it was accepted that this was basically unacceptable especially given the delays so far experienced)
2. Adapt existing accommodation to have a PF of 100 and no specific blast protection. This would be the most cost-effective option.
3. Do nothing and simply look for existing accommodation which could be earmarked and taken over when necessary.

The Minister, Mr Mayhew, opted for option 2 but said that a PF of 100 should be a minimum. Moreover, the site must however be 'permanently available' meaning that a dedicated building should be prepared rather than earmarking private accommodation. In reality this meant that a basement in an existing building could be sufficient and that a new-build based on the Chilmark plans was no longer needed.

This of course meant that the criteria the PSA was using in its search, and had been using for several years, needed to be completely changed and in a letter that the Home Office sent to the PSA they said: "We are looking for accommodation that will not need to provide any blast protection and that has been or can be cheaply converted to have a PF of about 100 ..." This really meant that the Home Office was no longer looking to build a new bunker but wanted an existing building that could be converted, and converted cheaply.

This meant that much of the PSA's efforts to date had been wasted and that in particular Llanberis Pits was now a non-starter. The Home Office official did however add in his letter asking the PSA to look for an existing building to meet the new criteria: "I am sorry if this change of policy has caused unnecessary work..."

Llandudno junction reconsidered

The PSA started looking again with little success. After rejecting a disused hospital as being too small the Home Office did accept that there were no new sites in North Wales which met the criteria. Perhaps oddly, there is however no suggestion that the surviving, heavily

protected part of the Llanberis Pits bomb store should be looked at. This would have provided more than enough accommodation and would appear to have fitted the Home Office's needs well.

It is tempting to ask if the Home Office actually knew about it. But the only site (re-)offered was the cold store at Llandudno Junction and, with obvious reluctance, the Home Office accepted the PSA's suggestion and reconsidered it. However, in a letter to the Welsh Office they were to describe it as "the best of a very small number of not very satisfactory options" and later, as "the best (if not the only one) of a number of uninspiring options in N Wales", adding "...but there is nowhere else to go".

On a more positive note, the earlier concerns caused by problems in the conversion of the cold store at Loughborough to SRHQ 3.2 had by now been somewhat overcome by the success of the conversion of the identical cold store at Hexham for SRHQ 1.1, and in March 1983 they asked the PSA to start considering rough costs. They were told these would be some £1.26m (say £4.4m at 2017 prices) assuming that the conversion was practically the same as Hexham.

SRHQ 1.1 located in the cold store at Hexham in 1997. The building has now been demolished. Photo Richard Lamont

The Home Office formally asked the PSA to proceed with the conversion in May 1983. Incidentally, the Home Office started to refer to the site as Zone Headquarters (ZHQ) 8.1 rather than as SRHQ 8.1 at this time. This followed some confused discussions between the various government departments involved with civil defence as to what the sub-regional sites should be called but the change was purely to the designation. At this time the cost of the build had been included in the Home Office's budgets at £500,000 in 1984/85, £500,000 in 1985/86 and £400,000 in 1986/87. Spreading the budget until 1986/87 of course meant that the idea of completing the SRHQ estate by 1985 had been forgotten. The project was now and at last under way.

The project was handled by the Home Office which was responsible for civil defence in both England and Wales, but the Welsh Office was consulted at various stages and they too accepted the Llandudno Junction solution, albeit reluctantly.

The Cold Stores

The cold store at Llandudno Junction which is sometimes called Marl Cold Store in official documents dates back to World War II. At the start of that war the officials in the Ministry of Food (some of whom had, incidentally, been evacuated to Colwyn Bay some four miles east of Llandudno Junction as part of the Yellow Move to evacuate civil servants from Whitehall) realised that with the increasing government control over bulk food supplies, the need to build up strategic reserves and the need to disperse food stocks away from the ports of Liverpool and London, there was an urgent need to increase the national supply of cold storage to hold, in particular, frozen meat.

The cold store at Goldsborough, North Yorkshire. Photo Nick Catford

As a result 48 large new cold stores were built between 1941 and 1943 for the Ministry of Food although one, the large store at Weaste in Salford, was leased out of government control to a private company. These stores had a storage capacity of fifteen million cubic feet which added some fifty percent to the national capacity. These included a store at Llandudno Junction, which is a small town a few miles south of Llandudno itself and which grew up around a railway junction and an important railway engineering centre.

Table 2 - Locations of the World War II cold stores

Store with a nominal capacity of 1,000,000cubic feet	
Aintree	Cardiff Docks *
Stores with a nominal capacity of 500,000 cubic feet	
Crewe	Weaste, Salford
Avonmouth	Tamworth *
Hunslet, Leeds *	Wolverhampton
Stores with a nominal capacity of 250,000 cubic feet	
Hexham *	Stourport *
Northallerton *	Warwick
St Helens *	Bedford *
Willington *	Ely *
Doncaster	Luton *
Goldsborough *	Bishops Stortford *
Stratford-on-Avon *	St Albans *
Dringhouses, York *	Artington, Guildford *
Chelford *	Alton
Heywood *	Banbury *
Ribbleton, Preston *	Kennington, Oxford
Hereford *	Tilehurst, Reading *
Llandudno Junction	Newbury
Derby	Finhoe, Exeter *
Wigston, Leicester *	Wells
Lincoln *	Kilmarnock *
Loughborough *	Paisley *
Sutton-in-Ashfield	Perth *
Chapel Brampton, Northampton*	Llantarnham *
Woodston, Peterborough *	Shrewsbury

* reported as demolished

Apart from six (see Table 2) the stores were some 200 feet by 140 feet and built on three floors to a standard design giving an internal storage capacity of some 250,000 cubic feet. Additional single-storey buildings were provided at each end of the main building to house plant and offices. The utilitarian main buildings were steel-framed with a windowless, external double brick skin which was sandwiched with cork slab to give additional insulation. They were designed to maintain an internal temperature of 14 to 16 degrees Fahrenheit using brine as the refrigerating liquid.

Inside, each floor of the main building was divided into two or three storage areas which were left open to facilitate access although this effect was spoiled by the large number of pillars supporting the upper floors and roof. They all had a railway spur connecting them to a railway line, and in the case of Llandudno the connection was to the Chester to Holyhead main line. Sidings were laid either side of the main building to facilitate the movements in and out of the large quantities of foodstuffs the stores handled.

The Goldsborough cold store in the mid-1970s showing the proximity of the connecting railway line. Photo John L Smith

Corned Beef

Excluding the costs of the land but including all plant and the connections to a railway line, they cost £7m (say £320m at 2017 prices). Apart from the larger stores they were usually built in rural locations outside of towns.

During the war they were used mainly to store meat with some bacon, butter and eggs. They were retained after the war for strategic purposes and continued to be operated by private companies acting as agents for the government. With the end of food rationing and the decontrol of the cold storage industry in the mid-1950s, there was no longer a need for the cold stores but at that time canned corned beef was being introduced into the food stockpile and the majority were converted to store this meat in dehumidified conditions.

In this way the store at Llandudno Junction held 3,199 tons of canned corned beef in 1958. This pattern was repeated elsewhere so that in 1965, 38 of the stores were being used to store corned beef together with some long-life margarine and yeast, five were empty and four had been sold back to the trade.

A nostalgic scene from 1979 showing an ex-GWR Hall class loco on the siding of the Warwick cold store. Photo www.warwickshirerailways.com

In practice, corned beef is very heavy, and soon after it was introduced it was suddenly realised that the boxes were being held without any consideration to the designed floor loading of the stores – in many places this limit was being seriously exceeded. This led to some hurried redistribution both within stores and among them.

By 1967 the government had stopped stocking corned beef and it was found that the margarine did not need to be kept frozen, so it was decided that there was no longer a need to retain the cold stores. However, due to restrictive agreements made during the war it proved impossible to dispose of them all and some were retained.

Fifteen, including Llandudno Junction which had an available floor area of 31,276 square feet, were converted to dry stores to become civil defence buffer depots, two were used by the army to store its compo ration packs and three were retained to store old corned beef which was unfit for consumption pending a decision as to how to dispose of it. It appears that with the end of the Cold War these remaining stores were disposed of and many have now been demolished.

The Chelford, Cheshire cold store during demolition in 2016. Photo www.chelfordvillage.org

Conversion

The plans for the conversion of the Llandudno Junction site were based on those drawn up for the conversion of the Hexham store. This would involve leaving the third floor of the main building as an unused void and putting a 10-inch reinforced concrete envelope over the ground and second storeys.

The basic fabric of the building was a structural steel frame supporting brick walls to which the reinforced concrete envelope would be stud-bolt anchored. The second storey would be used to house most of the domestic facilities, the dormitories and kitchen/canteen, while the operational and working areas for the Regional Commissioner and his staff would be on the ground floor. Removing the unwanted top floor was considered but dismissed as it would be costly and draw unwanted attention to the building work.

The plant would be installed in the single-storey accommodation at the ends of the main building which would be topped by a 15-inch reinforced concrete slab that should be sufficient to take the debris load falling from the main building if it were damaged. This would give the food store the same degree of protection as at Hexham and Loughborough and it appears that the idea of reducing the protection to a PF of 100 had either been forgotten or simply ignored so that the existing plans could be reused.

A recent internal view of the Llantarnam cold store showing the supporting pillars. Photo by 'MODman56'

The cold stores had originally been provided with septic tanks for sewage which was adequate for their small staffs. It would not be adequate for the much larger wartime staff of an SRHQ and the rather novel approach of simply pumping the waste onto surrounding land was adopted.

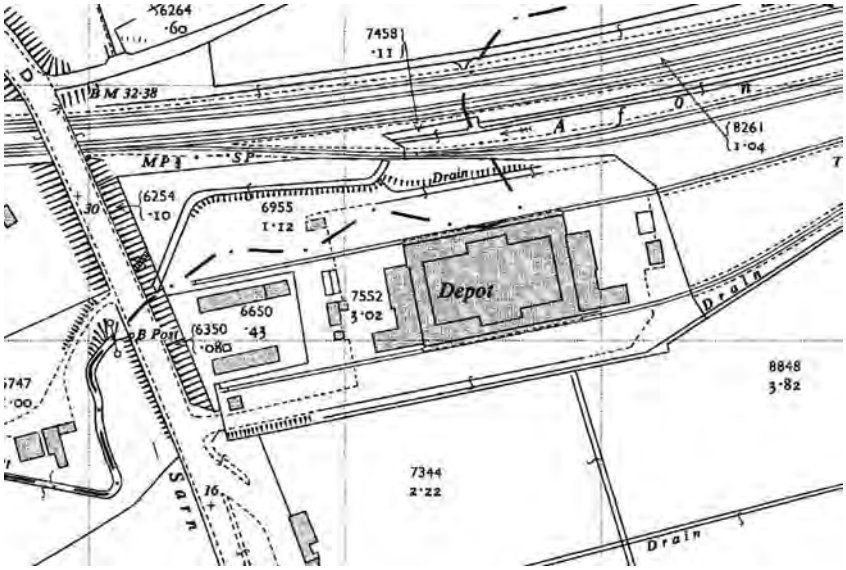
There was some concern that the building would be open to public gaze from nearby roads, particularly the newly enlarged North Wales Expressway which would be one of the busiest roads in Wales; there would be little chance of hiding it by landscaping. This however seems a rather odd concern given that the building had existed in clear sight for some forty years.

New problems

But then two other problems emerged. Firstly, local Welsh nationalists started asking questions of the Ministry of Defence about why the army was looking for land in North Wales. This caused the Home Office concern that its plans had leaked and would meet with local opposition. However, it appeared that this might have been triggered by local concerns about a potential cruise missile base in the area and not the potential SRHQ, but it demonstrated local sensitivities.

The PSA was also concerned that applying for planning permission would generate unwelcome publicity and suggested a personal approach to the Chief Executive of Aberconwy Council, the local authority. The PSA thought he would not raise objections but they mentioned that the Chief Executive of Gwynedd County Council was a member of CND!

The second problem related to the existing use of a small part of the site by the Royal Navy Auxiliary Service (RNXS) as a communications centre. In war, the RNXS would have a role in assisting merchant ships using ports and emergency anchorages. Their presence would pose two problems for the SRHQ. The physical presence of the RNXS site and its personnel were thought to pose a security risk to the SRHQ and it was said that for safety reasons they could not stay on site during construction work, and secondly there were concerns that the SRHQ and RNXS radio transmissions would interfere with each other.



1:2,500 OS map of Llandudno Junction cold store in the late 1950s showing the core building, the loading bays, the single storey extensions and the sidings to the main line

However, the Home Office accepted that the RNXS could stay. But then the Home Office's Directorate of Telecommunications people were consulted. They said that line (ie telephone and telegraph) communications with the site were as good as any other site in North Wales but it was doubtful if radio, which was largely installed in the SRHQs as a back-up, could be used because a clear radio route into the site could not be found. This caused further delays of some three months before the Directorate found a radio route into the site and one which apparently did not require any new, and therefore expensive, aerial sites. It is not known if a roof-mounted radio mast was included in the plans for Llandudno Junction as had been installed at Hexham and Loughborough.

Demolition of the Loughborough cold store converted to RGHQ 3.2, showing internal structural detail. Photo Keith Ward

Discussions were by now being held with the Home Office and PSA's designers which resulted in the Home Office asking for many changes from the Hexham site plans. The PSA pointed out that this would require a complete redesign of the air handling plant and the ground floor electrical layout, and would consequently delay the start date. However by early 1984 the project seemed to be moving along steadily although it was obvious that the site would not be operational by 1985. And then the Home Office dropped a bombshell on the PSA.

Lack of money (again)

By this time new Civil Defence (General Local Authority Functions) Regulations 1983 had been introduced imposing a series of requirements on county and district councils. One of these was that each County Council and District Council should have an Emergency Centre and that County Councils should also have a reserve centre. Several hundred expensive new or refurbished centres would be needed and the local authorities could apply for a Home Office grant to cover 75 percent of the cost. Additionally, new and expensive communications equipment, notably the MSX message switches, were to be installed at all the Royal Observer Corps group controls, regional bunkers and the local authority emergency centres.

The Home Office's budget was not increased to match these unplanned costs and something had to give; the ZHQ estate was an obvious target. The money for the as yet unstarted conversion of what was now being referred to as "Crown Building 8.1" into ZHQ 8.1 was reallocated and the PSA was told in May 1984 to defer the start of building work to a new start date of April 1986 when new money would be available and by which time the ZHQs had been redesignated as RGHQs.

Farncombe cold store in 1997. Photo Nick Catford

Planning work continued for a few more months but it seems that the money was never forthcoming and the project was quietly forgotten by the small and overworked civil defence staff of the Home Office until, with the ending of the Cold War, it was no longer needed. All planning for a new headquarters to replace Southport was also stopped at the same time although a site had not been finally settled. Crowborough, as the replacement for Dover, had a much higher priority and was completed but plans to refurbish and improve some of the existing sites were also shelved.

Table 3 - RGHQ estate in England and Wales 1986

Site	Sub-region	Status
Hexham	2.2	fully operational
Shipton	2.1	fully operational
Skendelby	3.1	fully operational
Loughborough	3.2	fully operational, but additional blast protection planned
Bawburgh	4.1	to be taken out of commission for refurbishment
Hertford	4.2	may need major refiurbishment in future
Kelvedon Hatch	5.1	operational but new generator still needed
Crowborough	6.1	Work due to start 1986/87. Dover had been abandoned
Basingstoke	6.2	fully operational, but additional blast protection planned. Roof still leaked.
Chilmark	7.1	fully operational
Hope Cove	7.2	major refurbishment needed
Llandudno Junction	8.1	no funds allocated
Brackla	8.2	operational, some refurbishment planned
Swynnerton	9.1	due for refurbishment
Drakelow	9.2	fully operational
no site	10.1	Southport abandoned, new site not found
Hack Green	10.2	fully operational

This was thus the end of the short-lived plan to complete the SRHQ/RGHQ estate as intended by the 1980 home defence review. It had become, as so many civil defence plans had in earlier years, the victim of a lack of funds, which really reflected a lack of political interest. As was said in the 1960s "there were no votes in civil defence".

However, some sites had been completed, as shown in Table 3. The position was far from satisfactory but better than before.

At the very end of the Cold War when the Royal Observer Corps was disbanded, its former Group Control at Borras in Clwyd was, for a few months, nominally the RGHQ for North Wales. In reality nothing was done to refurbish the control which was in any case far too small for the role. In practical terms it could not be considered as an RGHQ, leaving sub-region 8.1 without a controlling headquarters and leaving the Llandudno Junction Cold Store as the bunker that never was.

SOURCES: Most of the information in this article comes from files held at the National Archives and in particular file HO322/957 and ones in the MAF99 series.

Willow Row Barrow – a Niche Solution

John Shere

An interesting new structure has been built in rural west Cambridgeshire. This is the second twenty first-century niche long barrow to be constructed in the country. Willow Row Barrow in Hail Weston is a hand-crafted stone burial mound built as a resting place for cremation ashes and is thought to be the first one to be built in the county for 3,500 years.

You may wonder why I'm writing about this instead of my normal Royal Observer Corps related subjects. The reason is that this unusual burial mound has been constructed less than five miles from where I live and they recently had an open day. Sacred Stones is a new company that has commissioned the barrow and is looking to create contemporary places of rest that capture the essence of what these ancient places meant to our ancestors.

The past inspires the future

When I went to visit Willow Row Barrow I was surprised by the level of craftsmanship. The mound has been built by a team of master stonemasons using stones on top of natural stone just like the dry-stone walling technique. The circular structure is covered with earth and has a natural material matting on top to protect it and as a base for wild flowers.

The approach to Willow Row. Photo John Shere

To reach the Barrow you have to leave a farm entrance to walk down a track which is next to a wood. This adds to the tranquil effect but if you do visit, then I suggest wearing walking boots or similar. When I turned the corner at the end of the wood I was immediately struck by the beauty of the stone-fronted entrance which looked like a modern-day Fred Flintstone cave house!

Once you go through the entrance you realise that there is no natural or electric light. The interior is lit with candles

The stone-fronted entrance. Photo John Shere

Looking out from the central chamber. Photo from Sacred Stones website

alone. You find yourself in a circular chamber eleven metres wide and six metres high with an impressive central circular stone roof. The barrow is built from limestone that came from Buckinghamshire. A team of four craftsmen took six months to build this structure. The burial ashes are to be placed in 'niches' which are like stone shelves for urns.

The niches are located all the way round the inside of the Barrow in rows. There are also some sets of circular holes where ashes are rolled up into felt pouches and put inside. There is space in total for 380 sets of ashes. The company's ambition is to build more of these Barrows in other counties; the first one was built in Wiltshire, a private commission completed in 2014.

Go underground for ever

Could these unusual Barrows could be a fitting resting place for departed Sub Brit members? (I have to mention here that I have no connection with the owners.) If, however, you wonder about how much this costs, then a standard niche for 99 years will cost you £4,800 and there's no restrictions on how many sets of ashes are interred (I think you could fit 4-6 at a squeeze using their felt urns) which is a lot less than buying a ROC Post. Unlike a normal cemetery, at Willow Row when your relatives first intern your ashes you – or rather, they – can have a private ceremony at the barrow for a whole day at no extra charge. The owner said you could even bring a brass band if you wanted! I do suggest, however, that you do not choose the band of the Grenadier Guards though as they will not have sufficient room!

Check the website www.sacredstones.co.uk to see some really good pictures and get more information. They will be having more open days soon which will be listed on the website.

A 16th century tunnel at Coombe Hill, Kingston-upon-Thames, Surrey

In or shortly after 1514 Thomas Wolsey [1475 – 1530] acquired the use of land for his new palace, Hampton Court, on the north side of the river Thames. This extensive range of buildings, when completed, had cold (but not hot) running water available 'on tap' from springs at Coombe Hill near Kingston-upon-Thames, the other side of the river. Water was conducted to the palace through a three-inch-diameter lead pipe laid in a trench and buried, and across the bed of the river, a distance of over three miles. As the springs were at a higher level than the palace, no pumping was needed. Several springs were tapped, each enclosed by a collecting basin in one of three 'conduit houses', called the Gallows, Ivy (or Bush) and the Coombe conduit houses. The first and last of these consisted of upper and lower buildings, and the Coombe Conduit House (the most interesting one) is kept in good repair and is open to the public from time to time.

The 'houses' are neatly constructed of stone and brick, with their lower parts below ground level. Small feeder tunnels about two feet high lead into them, and upper and lower Coombe houses are linked by a tunnel 81 feet long, five feet four inches wide, and from seven feet nine inches to ten feet six inches high. The floor falls nine inches toward Hampton Court. The system remained operational until 1876, and the legalities attaching to it were all wound up in 1900.

A description in the journal of the Surrey Archaeological Society includes a map of the pipeline, and measured drawings and photographs of the exteriors and interiors of the conduit houses and tunnel.

The site is managed by the National Trust, although that body's *Members' Handbook* provides no exact details of location or opening times. The house stands in grounds on Coombe Lane on the outskirts of Kingston, occasional opening times being advertised locally and presumably on the NT website www.nationaltrust.org.uk or enquiries@nationaltrust.org.ukSOURCE: FORGE, J.W. Lindus, 1959, Coombe Hill conduit houses and the water supply system of Hampton Court Palace. *Surrey Archaeological Collections* 56, 3 – 14 including two folded pages of measured drawings and plates i – v

Discounted Cotswold Shopping

Cotswold Outdoor have granted Sub Brit members a 15% discount on their products (excluding sales and special offers). The details are included in a letter on the website at www.subbrit.org.uk/docs/discount-cotswold-outdoor.pdf

If you are not able to access the website, then please contact us with an SAE for a copy of the letter.

The discount code can be used in any of their 58 stores (there is a barcode on the letter), and for telephone and online orders.

**** Please do not share or abuse the code as this may lead Cotswold to withdraw it which would be a great shame and spoil things for the rest of our members. ****

Here is an introduction from David Hague of Cotswold:

"Cotswold Outdoor are proud to be a supporter of such a prestigious organisation as Sub Brit. As most of your members are aware, Cotswold Outdoor is a multi-award winning retailer with numerous thriving stores located nationwide. Not only are we proud of our knowledgeable staff, but our stores stock one of the most comprehensive ranges of outdoor clothing and equipment in the UK. With a huge range of footwear, waterproof jackets and fleeces, tents, sleeping bags and outdoor accessories, we offer one of the best selections of clothing and equipment right on your doorstep.

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